East Engng
Library

FEBRUARY 26, 1942

The IRON AGE

FEB 27 1942

MESTA

HEAVY DUTY
TURNING
AND
BORING
LATHES

MESTA was among the first to be awarded the FLAG of the UNITED STATES BUREAU OF ORDNANCE and NAVY "E" PENNANT.

MESTA MACHINE COMPANY, PITTSBURGH, PA.

A TOUCH ALLOY for a HOT JOB

WHEN it comes to good alloy castings, there is more to it than composition. The rest of it is design, experience, and foundry skill. Into our Alloy 502, go all these requirements. It contains 35 nickel and (please note) 18.5 chromium, and we've been making it for thirty years.

All our melting is by high frequency induction which assures uniform composition. . . . So, for all your "hot" jobs, you should investigate Alloy 502. It's available cast or wrought. Tell us your problem—we think we can help. . . . Hoskins Manufacturing Co., Detroit, Michigan.

HOSKINS PRODUCTS

ELECTRIC HEAT TREATING FURNACES • • HEATING ELEMENT ALLOYS • • THERMOCOUPLE AND LEAD WIRE • • PYROMETERS • • WELDING WIRE • • HEAT RESISTANT CASTINGS • • ENAMELING FIXTURES • • SPARK PLUG ELECTRODE WIRE • • SPECIAL ALLOYS OF NICKEL • • PROTECTION TUBES

HEATING ELEMENT WIRE — Chromel — NICKEL-CHROMIUM

FEBRUARY 26, 1942
VOL. 149, NO. 9

J. H. VAN DEVENTER
President and Editor
C. S. BAUR
Vice-President and General Manager

o o o

Managing Editor, T. W. LIPPERT
News & Markets Editor, J. A. ROWAN
Technical Editor, F. J. OLIVER

Associate Editors
D. R. JAMES
W. A. PHAIR T. E. LLOYD
Art Editor, F. J. WINTERS

Editorial Assistants
M. M. SCHIEN G. B. WILLIAMS
J. I. BUTZNER S. H. BARMASEL

Washington Editor
L. W. MOFFETT

Resident District Editors
T. C. CAMPBELL, Pittsburgh HERMAN L. KLEIN, Chicago
B. W. CORRADO, Cleveland W. F. SHERMAN, Detroit
CHARLES POST, San Francisco

Editorial Correspondents
W. P. DEARING, Buffalo ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston R. RAYMOND KAY, Los Angeles
HUGH SHARP, Milwaukee JOHN C. McCUNE, Birmingham
F. SANDERSON, Toronto, Ontario ROY M. EDMONDS, St. Louis
L. W. ALLISON, Newark, N. J. C. H. BACON, Seattle

o o o

A. H. DIX, Manager Reader Service

o o o

Advertising Staff
Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout.

o o o

Member, Audit Bureau of Circulation
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price United States and Possessions, Mexico, Cuba, and South America, $6.00; Canada, $8.50: Foreign, $12.00 a year.
Single copy, 25 cents.
Cable Address "Ironage N. Y."

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices	Editorial and Advertising Offices
Chestnut and 56th Sts.	100 East 42nd St.
Philadelphia, Pa.	New York, N. Y.
U.S.A.	U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

This Week in . . .

THE IRON AGE

Editorial
Single Track Minds With One Purpose 41

Technical Articles
One Shot Method of Forging Shells 43
Freight Takes to the Air 47
Drilling Hardened Parts 52
Lubricant Selection for Ball Bearings 57
Plastics in a Metal Plant 59
Single Spindle Automatics 63
New Equipment Finishing Apparatus 64

Features
Assembly Line 70
Washington 74
West Coast 78
Fatigue Cracks 82
Dear Editor 84

News and Markets
This Industrial Week 86
News of Industry 89
Personals and Obituaries 117
Machine Tool Activity 120
Pipe Lines 122
Non-Ferrous Metals 123
Scrap Markets 124
Iron and Steel Scrap Prices 126
Comparison of Prices 127
Finished Steel Prices 128
Warehouse Prices 130

o o o

Products Advertised 148
Index to Advertisers 183

Copyright, 1942, by Chilton Company (Inc.)

Whenever Steel is Needed..

In peace and war, in good times and bad—year-in year-out for a century—Ryerson stocks of steel have been American industry's prompt, dependable source of supply.

Today, war production requirements come first—but Ryerson is serving, too, the needs of other essential industries from which flow the goods that feed, clothe and house the nation,—that supply its power, its minerals and other raw materials—all part and parcel of the mighty war endeavor.

The two-fold Ryerson function is to supply steel where needed, without delay—and to aid in the most effective, intelligent use of that steel in every way that experience and skill can suggest.

Wartime demands have made inroads in Ryerson stocks, but Ryerson resources are at your command, to assist you in meeting any problem of steel supply or application.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

THE IRON AGE

FEBRUARY 26, 1942

ESTABLISHED 1855

Single Track Minds With One Purpose

THIS land of liberty was built by men of single track minds and one purpose. And that liberty can be preserved only by that same kind of thought and action.

These men who built America saw but one road ahead of them. There were no detours or side-tracks. They did what they had to do, whether it was upon the battlefield or the frontier, with the one thought and purpose of getting the job done. There was no equivocation; no stopping to weigh eventualities. They lived, fought and worked for the day and because of this, they won the future. Had they lived and worked for the future, they would have lost the day and the future too.

There was a time, not long ago, when we were thinking and talking about industry after the war. That was before Pearl Harbor!

What may happen to industry and all the rest of us after the war is now insignificant and immaterial compared to what may happen before the war is over.

Post war industry will take care of itself, if we take care of present war industry. That's our big single track one purpose job, regardless of our politics, our station in life, our creed or color, or any other tag that may be tied to us.

Most of you who read THE IRON AGE, and we who edit it, are believers in the American System of Enterprise. But if any of us have the mistaken notion that we are fighting to preserve that, we have missed the big point. What we are fighting for and must fight for desperately is to keep from having imposed upon us the Nazi or the Jap system of enterprise.

I do not think that any of us would like either of those systems.

In spite of our great industrial capacity, we are in a dangerous situation. Our enemies have a real chance of beating us because they have been storing up war power for ten years and we have just begun.

It is something like two communities that decided on fire protection. One of them bought a small pump and a big standpipe. The other bought a big pump but no standpipe.

The first community kept its little pump running night and day, building up a head in the standpipe. The other waited until the fire broke out and then found to its dismay that "little and often" is better than "large but late."

So, brethren and sistern, if doubt about what the war may do to your way of life is holding you back from the all out effort, I advise you to forget the future and live and work for the day. Put your shoulder to the wheel and strain until it hurts. We can trust American common sense to shape our future system of enterprise if we win but we cannot expect Hitler or Hirohita to do it to suit us if we lose.

J. H. Van Deventer

Over a Million Soldiers Will Sleep on Cots of Inland Steel

To equip and maintain our Army, steel is needed in vast tonnages—not only for guns, tanks, shells and bombs—but also for such commonplace articles as beds, stoves, cans and lockers.

As an example—more than 14,000 tons of Inland rail steel already has been ordered for frames for Army cots. Soon these will be completed and in use and then over a million American soldiers will sleep on cots made of Inland steel.

Rolled from used railroad rails of the highest quality, Inland rail steel is particularly well suited for this purpose—not only because of its economy, strength and stiffness—but also because its use helps to conserve new ingot steel for the many other requirements of the defense program.

In the rail steel department and throughout the entire Inland organization men and mills are working at top speed to produce and deliver steel when and where it is needed for our own and our Allies' armed forces.

SHEETS • STRIP • TIN PLATE • BARS • PLATES
FLOOR PLATE • STRUCTURALS • PILING • RAILS
TRACK ACCESSORIES • REINFORCING BARS

Fabricating Inland rail steel into frames for U. S. Army cots.

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

"One-Shot" Method Of Forging Shells

By W. P. MUIR
Chief Engineer, Mining, Metals & Plastics Machinery Department, Dominion Engineering Co., Ltd., Montreal

. . . For comparative data on other methods of forging artillery shells, refer to the following issues of THE IRON AGE: Baldwin-Omes method, Oct. 10, 1940; upset method, Jan. 16, 1941; Witter process, July 3; General Motors, set-up (induction heating and upsetting), Aug. 7; and pierce and draw method, Oct. 2, 1941.

A NEW process of forging artillery shells has been developed by the Dominion Engineering Works, Ltd., Montreal, Canada, working on the assumption that the piercing process must be improved to meet modern requirements as to cavity finish and dimension. The "one-shot" process is based on a new principal of piercing not used before. By its use shells with finished forged cavities are being produced in one press stroke to an accuracy not heretofore obtainable, with exceptionally low tool cost and negligible rejections.

One of the most serious troubles in the older piercing operation was eccentricity, which is the worst bugbear of shell forging. To lick this, the first requirement is a stiff press. Next would come a well guided punch, but the position of the billet in the die must not be forgotten because if the billet is not truly central when the punch starts to pierce it, a concentric forging cannot be obtained. In the Dominion shell forging press, a split die is used for holding the billet, which is square, with flat corners. The proportions of the die are such that when the two halves are closed they produce an appreciable grip on the billet, thus ensuring concentricity of the billet in the die. The die holders also close around a stiff guide for the punch.

Inaccurate centering of the billet in the die is not the only reason for eccentric forgings, however. If the forging is to be made to a length approaching the required finished forging, it will be longer than the billet of the required weight, even though the latter may be of a square section. This condition entails a lengthening of the forging during piercing if subsequent drawing is to be dispensed with. All previous methods of piercing entailed some lengthening of the forging against the motion of the punch. This counterflow of metal is called extrusion, and resulted in excessive punch pressure to produce plastic pressure ahead of the punch to force the metal past the taper part of the punch tip, opposite to the natural crowding action of the taper and against the resultant die friction caused by this crowding. This excessive punch pressure resulted in high tool cost, scored cavities and aggravated punch springing, causing eccentricity. It was found impossible to pierce satisfactorily to a depth of more than four punch diameters.

The new method is the first one to attack the piercing problem by allowing the metal to be pushed ahead of the punch without extrusion and at all times to be in intimate contact with the punch, producing finished cavities of accurate dimensions and fine finish, with punch springing and resultant eccentricity reduced to a minimum even with larger ratios of punch diameter to pierced length than considered possible before.

The machine consists essentially of a very stiff, down stroking, side housing type of hydraulic press with an intermediate fixed platen and a vertically split die arrangement between the intermediate and lower fixed platens. The dies are closed about top and bottom guides by hydraulically actuated wedges. The punch descends through the top guide which is rigidly held in the

A HOT billet has just been forged into a finished cavity shell in one of the new Dominion "one-shot" shell presses. The flame and smoke is caused by the powdered coal used as a lubricant for the punch.

intermediate platen and also by the dies. During forging, the dies also close around a bottom guide containing a so-called resistance pin which forms the base of the die. This pin is backed up by a hydraulic ram in the base and controls the forging. It is used to support the billet as the dies close and during initial piercing until the top end of the billet has been expanded by the punch into frictional contact with the die walls, after which it is allowed to recede under controlled hydraulic resistance and thus permit lengthening of the forging ahead of the punch.

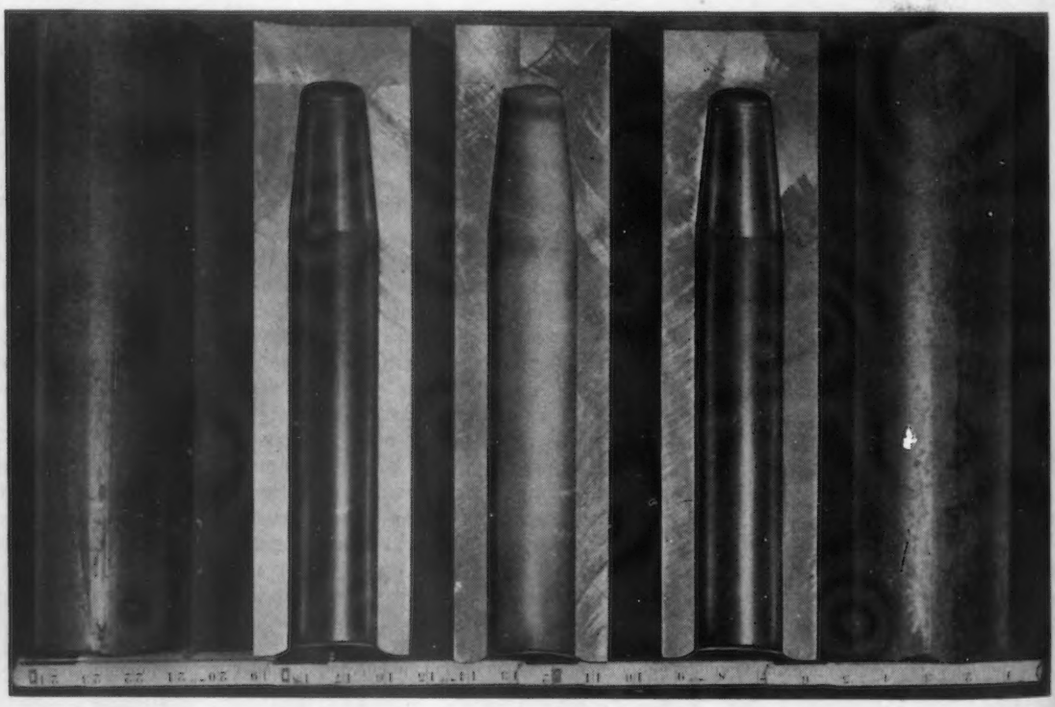
The valves are all automatic, and are operated by one button which is depressed as soon as the billet is placed in the die. A "stop" button to reverse the press and return it instantly to the open position is within easy reach of the operator at all times.

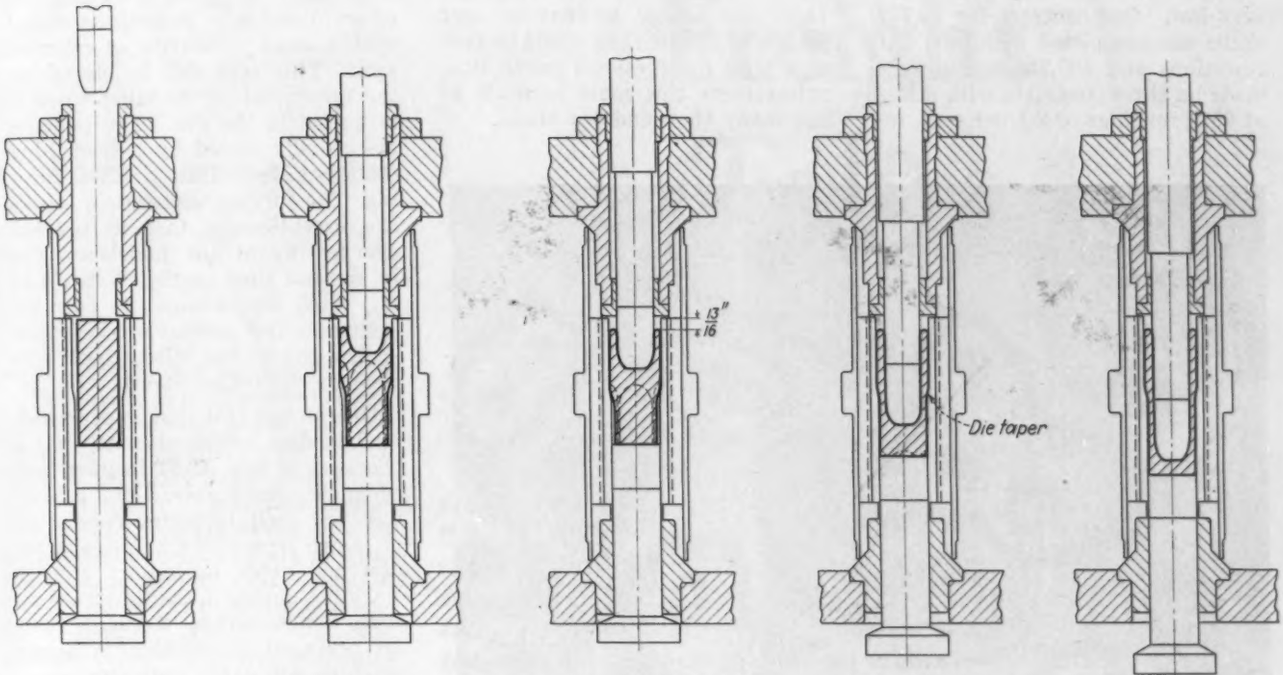
The forging action can be clearly visualized by the cross-sectional drawing showing actual forgings at different positions of the punch travel. These sections were taken from the set-up used in forging the 4.5 in. howitzer shell. It will be noted that from Positions 1 to 3 during the initial expansion at the top the billet is actually shortened 13/16 in. before the base pin starts to recede. From that point on, as forging progresses, the metal in contact with the die at the open end does not move, being partly held by a short taper section and wall friction. Lengthening of the forging is controlled by the recession of the base pin alone, combined with the downward travel of the punch. Remarkably fine control of dimension is possible with this process. Base thickness can be controlled within 1/32 in. either way, although a tolerance of 1/16 in. either way is usually allowed to make up for possible variations in the weight of the billet, a great deal of which goes into the base of the shell. The open

o o o

SECTIONS of 3.45-in. 25-lb. finish forged cavity shell forgings made on a Dominion press. The center forging has received a preliminary sand blast in the cavity to clean out scale and give a good bond for a coat of lacquer.

o o o





FIVE steps in the piercing of 4.5-in. howitzer shell forgings by the one-shot method. At 1, the square billet is gripped firmly at the corners by the vertically split die. During the initial expansion at the top to fill the round cavity, the billet is actually shortened 13/16 in. at positions 2 and 3 before the resistance pin or base begins to retract at position 4. In this shell, a short taper section in the middle of the die helps to keep the open end of the shell from moving down any further during the remainder of the descent of the punch.

end is very regular and square and can be held within 3/8 in. of the required length.

By forming the top of the base pin, any required shape of the base can be had, such as a centering pip on the forging, and the base of the shell can be forged to any required thickness. Excessive metal is not required at this point as with the older methods of forging requiring extra thickness in the base to resist the piercing tendency of the drawing punch in the subsequent drawing operation.

The base pin need not be the full size of the parallel part of the die, and the die can be shaped to forge the boat tail end on a streamlined shell. As the press is brought down on mechanically fixed stops, the relationship of the forged shape on the outside to the cavity shape and depth is exact and can be controlled accurately. It is also possible to shape the top end of the die where required within limits to reduce the loss of metal in the rough turning.

The actual forging pressures have been greatly reduced by this method. Concentricity is excellent, and cavity finish satisfactory. Of course, as with any forging operation, if the tools are run too long, roughness will be encountered and some grinding or hand finishing will be required in the cavity. With careful inspection of the punch tips, no machine work on the inside of the cavity is required. One plant where one of these machines is installed believed at first that cheaper overall cost could be attained with a simple spade boring of the base of the cavity after rough turning. This operation has since been discontinued in this plant, and the remainder of these presses are in plants where no work is done on the cavity, except for hand grinding an occasional shell to remove scale marks, and no provision has been made in these plants for machining the cavity. Forgings from all of these plants are regularly shipped to other machining contractors with no work having been done on the cavity, and without rejections from cavity defects. Over half a million shells have been forged on these machines of all sizes up to and including the 5.5-in. high explosive shell having a forging length of 29 in.

SPECIALLY refined cast iron punch tips were developed which are much more economical than alloy steels tips. The photograph shows the progressive wear and heat checking on tips for 25-lb. shells.

Rejections from these presses are very low. One contract for 15,707 shells was completed with only 121 rejections and 309,236 shells were made on three contracts with a loss of 6531 forgings or 2.1 per cent, including loss from starting up a new machine and changing to new sizes of shells twice.

With this process, remarkably low tool costs are possible. Due to the low forging pressures, low alloy cast iron punch tips are used and cast iron die liners. Punch tips are usually changed for redressing every 35 to 50 shells and their total life is from 250 to 400 forgings. Their cost is low, so that the cost per shell is lower than would be possible with hot die steel punch tips, unless these tips could be made to last many thousands of shells.

VIEW of the working space of the Dominion press showing the dies open and the three station turret with punches above (two punches are almost in line). During the pressing stroke, the two idle punches descend into oil cooling wells.

Due to the length of the piercing stroke, lubrication of steel punch tips has been difficult. Furthermore, steel tips have been found to have too close an affinity for the metal of the forging and to show a tendency to pick up steel from the billet, resulting in badly scored cavities. This does not occur with cast iron tips. The lubrication used with cast iron tips is powdered coal or petroleum coke, sometimes mixed with a small proportion of common salt. This material is placed on the upper end of the billet when it is loaded in the die. The punches are usually cooled by a quenching oil spray immediately after forging. The forging and return stroke are exceptionally fast to prevent overheating of the punches. The in and out time on the 25 lb. (3.45 in.) shell for example, is only 1.6 sec. from first contact of the punch on the top of the billet, until it is clear on the return stroke.

Overall tool cost should, of course, include dies, punch shanks, etc. A check-up at one plant forging 3.45 in. shells shows overall tool cost of 9.5c. per shell, including redressing of punch tips, cost of tips, shanks, dies and guide bushings. On the machines shown in the illustrations, three punches on an automatic turret are used in rotation. A newer machine will carry four punches.

Production rates on these machines are going up all the time, and at present are up to 175 per hr. Output of 1050 to 1100 forgings per 8-hr. shift, and 3200 per day, are the regular run for forging shells of the British 4-in. naval shell, including time lost changing punch tips and furnace delays. This plant is also producing the 5.5 in. shell on another machine. This shell is 29 in. long and weighs 135 lb. in the forging. The punch for this shell is 6½ diameters long in the forging; nevertheless eccentricity difficulties are not serious. Production rates of 80 to 100 per hr. are regularly being made on this size shell.

The press proper requires the services of only two men, one to operate the controls and one punch tender at the back of the machine. Eight or nine men, however, usually comprise a crew including furnace tending, loading, unloading, descaling, which is usually done by hand, and loading the press. The same crew take the finished forgings from the press and stack them in the cooling bed.

The first press of this type got into full production in January, 1941, and four of these presses are now in use. They have made the British 3.45-in. H.E., the 3.7-in. A.A., the 4.5-in. howitzer, the 4-in. H.E. naval, and the 5.5-in. H.E. shells, and will no doubt be used for other sizes when the demand arises.

Freight Takes to the Air

o o o

By ROOSEVELT DER TATEVASION
Philadelphia

o o o

. . . Following the war, airplane production and maintenance will be geared to levels that will probably be far in excess of demands, resulting in keen competition for the air business of the American continents. This critical survey for the future of air freight, based on current trends and developments, economical, commercial, and technical, indicates that much of the land and sea freight movement may take to the air.

o o o

"SHIP Via Air Express!" This phrase is destined to become as familiar a part of the American vocabulary as "Play Ball." Truly, air freight is a movement in which long-term competitive possibilities are great, though not apparent today. It is not too fantastic to predict that when air freight comes into its own, mammoth airliners will give the land and sea-going transports stiff competition for the hauling of heavy commodities, as well as passengers.

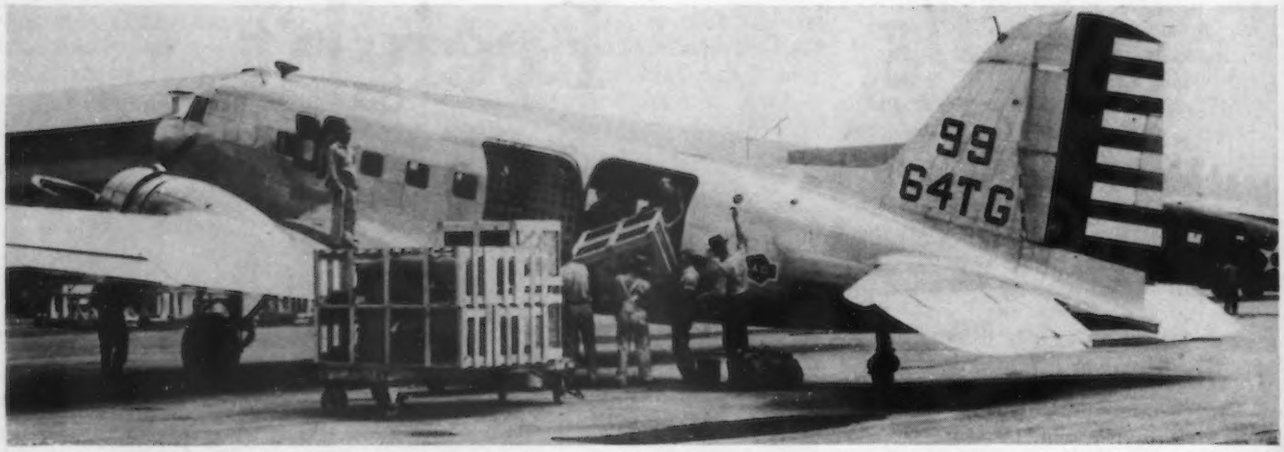
In the same manner as the airlines have slowly but appreciably cut into the Pullman traffic of the railroads, so will air freight slash into the freight business of its slower competitors. The problem that confronts those now surveying the potentialities of air freight are ascertaining the extent and location of the potential markets and current methods of servicing them. Having ascertained this, it is then up to air freight people themselves to (1) develop and increase the volume of shipments now moving by air, and, (2) compete, in earnest, for shipments normally handled by trucks and railway express.

Unhampered development of air express and freight would certainly be a boon for style goods manufacturers and growers of perishable goods such as fruits, vegetables and flowers. It is estimated that there are about 100,000 shippers or prospective shippers in the United States. Obviously, the incursion into the business of the trucks, shipping lines and railroads will of necessity be slow and gradual. In many instances, the airlines will develop new customers and new business by providing freight service which their competitors are in no position to offer. This would especially be true in the parts of our country where roads and rail connections are poor. In this connection, it is interesting to note that a recent Railway Express Agency survey revealed that off-airline express volume has been growing at a faster rate than that between airport cities. This volume increased about 64 per cent in shipments and 94 per cent in revenue from February, 1940, to the same month in 1941. This same study revealed that off-airline population was approximately 90,000,000, compared with 41,500,000 people serviced at airline connected centers.

Although the mobility of freight planes makes them fit well into the less-than-carload lots business, it seems reasonable to assume that air freight will not be able to compete for such bulk tonnages as coal, iron ore, lumber and many other similar commodities which provide the railroads with greater part of their revenue—at least, not in the near future.

Freight and Express Revenue

Since the underlying motive of every business venture is profit, it is worth reviewing air freight from the economic angle first. It is common knowledge that in the case of railroads, trucks, and steamship lines, at least 80 per cent of their revenue is derived from hauling freight, not passengers. This, however, is far from being the case with air transportation today. For example, for the five-year period from 1935 to 1940, the average income derived from the carrying of express and freight was less than 3 per cent of the total, compared with about 34 per cent from the carrying of mail and 61 per cent from passengers. Obviously, airlines have not scratched the surface of this potentially lucrative side of their business. An idea of the volume of future express and freight business for which the airlines will compete is evident from freight shipments in 1940. Railway Express shipments totaled 380,000,000 items, while only slightly more than 1,000,000 items were shipped by air, or less than 0.25 per cent of the Railway Express items. Another consideration is the volume of the country's first class mail, all of which will eventually be turned over to the airlines. In 1940, first class mail totaled 386,000,000 lb. and parcel post totaled about 3,334,000 lb. These figures are indicative of the enormous market inviting development, and the airlines will hardly dismiss these markets lightly. Air shipments are not limited to any one class of goods, but range from the perishable to the stable items, and from the lightest goods to heavy machinery and machine parts. Table I shows a breakdown for goods shipped during April, 1939, and how the volume of each item compares with the volume of other items.



THIS Douglas transport was converted into an Army flying freight plane, shuttling from the Douglas plants in California to air bases throughout the country speeding special parts to Army bases, manufacturers, and assembling plants.

At the present, the two main factors retarding the development of air express and freight are: (1) The limited number of planes available for commercial purposes, and, (2) the existing high tariff rates. Fortunately, both of them are temporary in nature. With the conclusion of the present crisis, the country's huge plane-producing capacity will be thrown wide open for commercial production and there will be plenty of planes available for freighting purposes. The conclusion of the war will be a signal for aircraft engineers and designers to devote their abilities and technical advances made during the war to the development of commercial planes. They will create planes with much greater pay-load capacities than any now in existence, since it is a corollary of airplane economics that the larger the cargo plane, the less the ton-mile cost. The Army's giant Douglas B-19, the "Hemisphere Defender," weighing some 85 tons with a total useful capacity of over 40 tons, compares favorably with the average freight boxcar. The payload capacity of an average freight car is 35 tons.

A uniquely-designed cargo plane that caught the eye of plane manufacturers and companies interested in air freight is Harland D. Fowler's "Container Type" ship. This plane, weighing 7 tons, is designed to have five containers, which, when assembled, form part of the fuselage. Each container is designed to hold 1000 lb. of cargo and the ease with which these containers could be handled would make it easy to designate one container for each major stop on the flight route.

Several years ago, in a lecture before the Pacific Coast Section of the American Institute of Aeronautical Science, Dr. Schyler Kleinhaus of the Douglas Aircraft Co. presented some aeronautical figures that attracted attention on both sides of the Atlantic. His lecture dealt with data that he had developed for an airship weighing 1340 tons, loaded weight, to carry 500 passengers, a crew of 100 and 174 tons of baggage and mail, with a 4800 mile cruising range at a cruising speed of 235 m.p.hr. Kleinhaus estimated that four engines of 50,000 hp. each would be needed for this air giant. The four power units would drive five-bladed airscrews 60 ft. in diameter, and the plane

TABLE I

Air Express Commodity Groupings.* Shipments for April, 1939

Commodity	Per Cent of Total			Average Weight per Item, Lb.
	Shipments	Weight	Charges	
Machinery and hardware, including aviation, automobile tires, electrical, miscellaneous machinery, hardware and oil supplies	17.6	26.7	23.3	9.1
Printed matter, including prospectuses, advertising, books, paper products, newspapers, racing forms and magazine proofs	17.8	25.7	18.7	8.7
Store merchandise, including textiles, samples, uniforms, wearing apparel, shoes, hats and furs	13.6	11.6	14.1	5.1
Moving picture films	4.7	7.4	9.3	9.5
Electrotypes and engravings	6.9	4.9	5.3	4.2
Valuable papers	6.8	4.0	5.0	3.5
Cut flowers	3.2	2.7	3.5	5.0
Valuables, including bank checks, gold and currency	5.2	3.4	3.3	3.8
Miscellaneous, including paintings, live insects and miscellaneous merchandise	2.7	3.0	3.1	6.6
News photographs	6.0	1.3	2.7	1.3
Drugs, etc., including drugs, serums, cosmetics and surgical instruments	2.3	2.0	2.2	5.4
Phonograph records	2.8	1.5	2.0	3.3
Flight manifests	3.5	1.6	2.0	2.7
Jewelry	2.6	.9	1.6	2.1
Food	1.0	1.0	1.0	5.8
Optical goods and cameras	1.1	.8	1.0	4.5
Law samples	1.1	.5	.8	2.8
Office supplies	.6	.6	.6	5.8
Personal baggage	.2	.4	.4	15.1
Liquor	.2	.2	.3	5.1
Total	100.00	100.00	100.00	6.0

* "Aviation," July, 1941.

would attain a ceiling of 12,000 ft. Dr. Kleinhaus estimated that the take-off would require 2½ min. and a 4¾ mile runway.

Assuming a power loading of 15 lb. per hp. and 70 per cent fuel power for normal cruising, Dr. Kleinhaus calculated 3120 tons was the maximum possible gross weight for a flying boat. He opined, however, that 1340 tons was the optimum weight for all-round efficiency.

The second factor retarding air freight development has been under study for some time. Steps have already been taken by the Civil Aeronautics Board to assure "competition to the extent necessary to assure the sound development of an air transportation system properly adapted to the needs of the foreign and domestic commerce of the U. S., the Postal Service, and of the national defense,"* with the consequence that several new air freight companies already have been organized. The two leading ones are Air Cargo, Inc. and the Universal Air Freight Corp.

**Civil Aeronautical Act*, 1938, Section 1 (d).

Air Cargo, Inc., was formed by the four major airlines of the country: American Air Lines, United Air Lines, Eastern Air Lines and T.W.A. Together, the "Big Four" do about 90 per cent of the total passenger, mail and express business of the country.

Universal Air Freight Corp., a subsidiary of U. S. Freight Corp., is also in operation today. Its operation is unique. The corporation utilizes the existing facilities of the airlines and the Railway Express Agency, but offers substantially lower rates on small packages than Railway Express. Universal, whose service at the present runs from New York and Detroit to 14 leading cities in the United States, applied to the Civil Aeronautics Board for a freight certificate, authorizing them to pick up and deliver air cargo "between all states of the United States." Universal is enabled to undercut the Railway Express rates by taking advantage of the lower bulk rates offered by Railway Express itself. This is how Universal does it. Since Universal's parent company has many thousands of trucks at its disposal, for both long distance hauling and local pickup and delivery, through some 3600 trucking associates and a number of steamship connections, Univer-

TABLE II

Curtiss-Wright Commercial Cargo Transport Operating Cost Analysis*

Performance	Length of Run, Miles			
	200	400	600	800
Cruising speed, m.p.h., at average gross weight	211	218	217	217
Cruising altitude, ft.	5,000	10,000	10,000	10,000
Time required at cruising speed, hr.	0.95	1.84	2.76	3.69
Average block time, with 15 min. allowed at 10,000 ft. and 9 min. allowed at 5,000 ft. for maneuvering	1.10	2.09	3.01	3.94
Average block speed, m.p.h.	180	191	199	203
FUEL AND OIL REQUIREMENTS:				
Time required with 20 m.p.h. headwind, hr.	1.05	2.02	3.04	4.05
Fuel time with maneuvering time plus one hr. reserve, hr.	2.20	3.27	4.29	5.30
Fuel load required, lb.	1,936	2,880	3,776	4,660
Fuel load required, gal.	322.7	480	629.3	777.7
Fuel consumed, lb.	970	1,840	2,650	3,470
Oil load required, 8 per cent of fuel by volume, gal.	25.9	38.4	50.5	62.3
Oil load required, lb.	194	288	378	466
PAYLOAD:				
Gross weight at take-off, lb.	42,970	43,840	44,650	45,000
Useful load, lb.	19,425	20,295	21,105	21,455
Fuel, oil and crew, lb.	2,530	3,568	4,554	5,526
Payload, lb.	16,895	16,727	16,551	15,929
Payload, tons	8.45	8.36	8.27	7.96
OPERATING COST:				
Direct flying cost per mile, dollars	0.559	0.526	0.505	0.495
Direct flying cost per ton-mile, dollars	0.066	0.063	0.061	0.062

* "Description and Estimated Performance," Curtiss-Wright Corp., St. Louis Airplane Division.

THE transports used for carrying cargo for the Army are stripped clean to provide the greatest amount of shipping space possible. Here, workmen are lashing down a shipment of airplane parts.

TABLE III

Ton-Mile Costs for Various Distances of Air Travel*

Length of Run	Actual Flying Cost, Cents	Total Operating Cost Including 70 Per Cent Overhead, Cents
200	6.61	11.25
400	6.30	10.70
600	6.10	10.40
800	6.21	10.60

* "Description and Estimated Performance," Curtiss-Wright Corp., St. Louis Airplane Division.

TABLE IV

Rate Comparison from New York to Boston*

Weight, Lb.	Parcel Post Charge, Cents per Lb.	Trucking Charge, Cents per Lb.	Railway Express Charge		Air Express Charge, Dollars per Lb.
			First Class Cents per Lb.	Second Class Cents per Lb.	
1	9	50	25	25	1.00
10	27	50	31	25	1.32
20	47	50	51	39	1.72
21	49	75	53	40	1.76
27	61	75	66	50	2.16
32	71	75	76	57	2.56
44	95	75	100	75	3.52
50	107	75	112	84	4.00
51	109	100	115	87	4.08
100	...	100	204	153	8.00

* "A Brief Study and a Plan for the Participation of the American Railroads in Air Freight Operations in the United States," by L. N. Selig, J. D. Michel, and A. Burstein, General American Transportation Corp.

sal collects small individual packages, sorts them according to their destination, combines them into bulk loads, and offers the bulk to Railway Express for shipment at REA's own low bulk rates. For instance, Universal charges a minimum of 65c. for a 1-lb. package, compared with a flat $1.00 rate charged by Railway Express. This practice is dangerous competition for Railway Express Agency, but REA can do nothing about it, since as a common carrier, it is obliged to accept all shipments offered for shipment. Railway Express could, of course, retaliate by cutting its own minimum weight rates.

CAB Action

The present competition in the air express and freight field has come about as a result of Civil Aeronautics Board's decision to investigate, under section 412 of the Civil Aeronautics Act of 1938, certain contracts existing between the REA and the airlines, to determine whether or not these contracts were in any manner "adverse to the public interest or in violation of any provision of the said Act; and whether or not there . . . (were) any other contracts between Railway Express Agency, Inc., and any air carrier or freight air carrier which are adverse to the public interest or in violation of any of the provisions of the said Act." The first of these steps was taken on Dec. 31, 1939. Two preliminary hearings were held before a final hearing was set tentatively for Jan. 5, 1942. Recently, the final hearing was postponed indefinitely, probably for the duration of the war.

Some of the facts of the case are as follows: Civil Aeronautics Board found that Railway Express was an air carrier during the "grandfather" period. The finding was based on section I (2) of the Civil Aeronautics Act which states that an air carrier "means any citizen of the United States who undertakes, whether directly or indirectly, or by a lease or any other arrangement, to engage in air transportation: Provided, that the Authority may, by order, relieve air carriers who are not directly engaged in the operation of aircraft in air transportation from the provisions of this Act to the extent and for such periods as may be in the public interest." The Board decided the Railway Express Agency should be included as an air carrier because it was "indirectly" engaged in air transportation. But the Board failed to issue a certificate to the REA because it decided that section 401 (e) of the Act "cannot . . . be said to include within its scope applicant's operations," was applicable.

But to leave the matter at this juncture would have been very confusing indeed, because even though REA, in the opinion of the board, was an air carrier, it would not have been able to operate without a certificate. In an effort to remedy the situation, the board temporarily exempted the REA from the necessity of holding a certificate.

By finding the Railway Express Agency, an air carrier, the Civil

TABLE VI

Airline Revenue Statistics*

Year	Express Revenue	Per Cent of Total	Passenger Revenue	Per Cent of Total	Mail Revenue	Per Cent of Total	Other Non-Mail Revenue	Per Cent of Total	Total Revenue	Per Cent Increase Over Previous Year
1935	$512,289	2.23	$12,712,010	55.41	$8,814,296	38.42	$903,950	3.94	$22,942,545	.....
1936	804,807	2.52	17,907,617	56.11	12,104,797	37.93	1,098,896	3.44	31,916,117	39.11
1937	1,200,584	3.24	21,707,576	58.50	13,088,358	35.26	1,112,639	3.00	37,109,157	16.27
1938	1,215,460	3.03	23,381,920	58.36	14,698,325	36.68	774,989	1.93	40,070,694	7.98
1939	1,604,058	2.93	34,340,240	62.90	17,739,205	32.49	913,147	1.67	54,590,280	36.23
1940	1,808,000	2.78	43,587,000	67.04	18,536,000	28.51	1,079,000	1.65	65,010,000	19.08
Totals	7,145,198	2.83	153,636,363	61.05	84,980,981	33.77	5,882,621	2.33	251,638,793	.....

* C. A. A. Annual and subsequent reports.

Aeronautics Board brought the company's air express activities under the board's supervision. Failure to do so would probably have placed the REA under the jurisdiction of the Interstate Commerce Commission.

Air Express Rates

If air express and freight is to offer railroads, trucks and steamships any sort of competition, it is necessary that the "lawful" rates be considerably lower than any now in existence. Since the present average Railway Express rate for purely railroad transportation is about 14c. a ton-mile, it is necessary that air freight and express rates be not much higher. A recent cost study entitled, "Description and Estimated Performance Report," made by the Curtiss-Wright Corp., for Curtiss-Wright's cargo model 20-C, indicates that comparative rates are possible. Examination of Table II shows that direct operating costs, covering all plane costs, including depreciation, insurance, fuel and oil, maintenance, and crew salaries, amounts to 6.61c. per ton-mile on a 200-mile run, or 6.21c. a ton-mile on an 800-mile run. Costs for intermediate distances are shown in Table III.

In order to obtain an overall cost of air freight service, overhead, ground costs, and profit must be added to these figures. On an average operating run of 300 miles, the direct cost per ton-mile would be about 6.25c. When an increment of 50 per cent is added to this sum, to cover overhead and ground costs and profit, the rate climbs slightly over 9c. a ton-mile, 5c. a ton-mile less than the current average REA rate! The 5c. differential allows an appreciable margin for variation in trip loads and other costs.

The Curtiss-Wright 20-C cargo plane is a two-engined model especially designed for freighting purposes. Because of its higher gross weight and the elimination of passenger equipment, payload is considerably increased and unit operating costs reduced correspondingly. The plane's performance guarantees are based on a normal gross weight of 20 tons. At maximum gross weight, a useful load of about 11 tons (21,455 lb.) may be carried. The corresponding useful load per gross weight ratio is approximately 47.7 per cent. The specially designed "sky truck" of tomorrow should be able to operate at 75 per cent of maximum capacity.

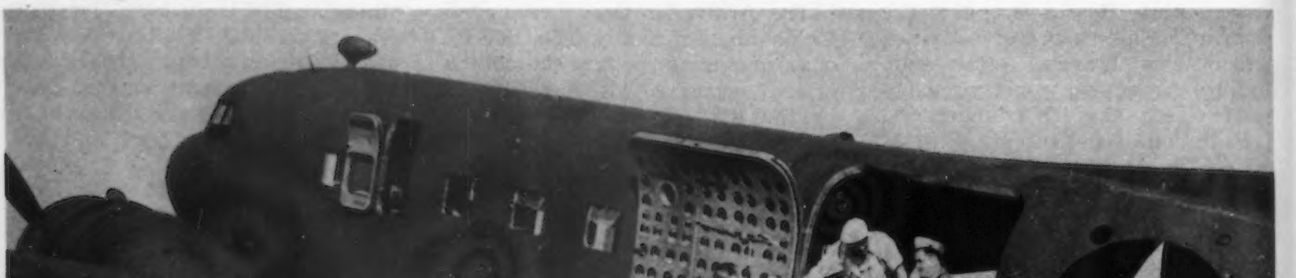
The Army Air Corps, estimated to have hauled nearly 6,800,000 lb. of cargo during the first six months of 1941, compared with 4,600,000 lb. by the REA, is reported to have ordered 300 of the Curtiss-Wright 20-C cargo planes, in addition to a large number of Douglas cargo ships. The large size of these planes and the freedom from obstruction of their main compartments provide remarkable facilities for convenient loading of bulky objects, such as airplane engines, mining equipment and similar heavy machinery.

Air express rates today are practically the same as when established by the Railway Express and the airlines back in August, 1934. The only change has been in the minimum charge. In 1934, the minimum was 85c. for 1 lb. or less. On Aug. 1, 1938, the minimum rate was raised to a flat $1 a lb. Air freight rates now are high enough to net more per ton-mile for 200 lb. of express than for carrying a passenger and his baggage weighing the same, even though 200 lb. of express does not require the attention of a pretty hostess, food, or other comforts available for passengers. Table IV illustrates the wide variance between the various methods of shipment between New York and Boston, a distance of some 229 miles by rail and 201 miles by air.

It is interesting to note from Table V that whereas shipments weighing less than 1 lb. constitute 25 per cent of total shipments and only 9.5 per cent of total revenue, while shipments weighing over 100 lb. represent only 0.4 per cent of the total shipment but 9 per cent of the revenue. Both in revenue and number of shipments, however, packages weighing between 1 and 5 lb. constitute the main source.

An inspection of Table II reveals that air express rates in this particular case, from New York to Boston, are nearly four times the first class Railway Express rates and more than five times the second class rate. With distance, the disparity between the two sets of rates grows much greater. A 100-lb. shipment from coast to coast, for instance, costs about $14 by rail, compared with about $96 by air, nearly seven times greater.

ORIGINALLY designed to carry 36 passengers and 5000 lb. of baggage with a five-man crew at a speed of 210 m.p.h., this Curtiss-Wright 20-ton transport proved so well suited for cargo and troop transport operation that it was promptly converted into an Army freighter.



LOADING a U. S. Army flying freighter. While to date freighters are loaded through side openings, as shown here, designs for ships that load through the nose are being developed.

General Air Express Agency

Prior to 1926, there was very little express and freight hauling by the airlines. The transfer of air mail from the Army to private carriers, however, came as a potent stimulant, giving rise to many independent efforts to develop this new phase of air transportation. Of these many efforts, however, two were outstanding, the American Railway Express, referred to as Railway Express, and the General Air Express Agency. Railway Express became quite earnest about its new venture in 1928 and began to sign up all available airlines. Until 1932, all of Railway Express Agency's competition was sporadic in nature. In August of that year, however, the seven major airlines of the country: Transcontinental & Western Air, Ludington Airlines, American Airways, Pennsylvania Airlines, United States Airways, Transamerican Airlines, and Eastern Air Transport, organized the General Air Express Agency to handle all phases of their express and freight business. The agency arranged with Postal Telegraph to perform its pickup and delivery service. In this manner, speed was associated with speed.

In the matter of rates, General Air Express Agency's tariffs compared favorably with those of the Railway Express. For example, GEA charged only $3.80 for a shipment from New York to Chicago, compared with $4.40 for a similar shipment via the Railway Express. GEA's ton-mile rate for a 10-lb. package from New York to Chicago was $1.06, compared with $1.19 charged by the REA. This was real and effective competition, and caused Railway Express to reduce its rates correspondingly, until by August, 1934, the average rate of the two air express companies was deadlocked at 86c. a ton-mile.

Slowly, the GEA gave ground, and, by 1935, practically every major airline was a member of the Railway Express group. The only exception was T.W.A. which made a valiant but ineffective effort to develop air freight business independently. In 1937, T.W.A. finally joined the REA system. Then as today, all foreign shipments were handled through the Pan American Airways.

In the opinion of many air freight experts, the airlines helped to stifle the development of their express and freight business by turning over to their keenest competitor the management of advertising, sales, and solicitation of express and freight for the entire air transportation system of the country. It is the experts' contention that the supposed REA efficiency in pickup and delivery, instead of decreasing rates has brought no such

TABLE V

Air Express Shipments by Weight During a Railway Express Agency Test Month

Weight Range, Lb.	Revenue by Weight		Average Rate, Dollars	Shipments	
	Total, Dollars	Per Cent of Total		Total, Lb.	Per Cent of Total
Up to 1	16,722	9.48	1.00	16,648	25.3
1 to 5	51,979	29.48	1.60	32,345	49.0
5 to 10	30,809	17.47	3.29	9,379	14.2
10 to 20	24,930	14.14	5.49	4,535	6.9
20 to 30	10,854	6.15	8.41	1,290	2.0
30 to 40	13,154	7.45	13.91	943	1.4
40 to 75	8,624	4.89	19.25	448	0.7
75 to 100	3,975	2.25	30.81	129	0.2
Over 100	15,241	8.64	65.13	234	0.4

blessing. In fact, the minimum charge has been upped from 85c. to a flat $1 a ton-mile.

It can be readily seen that, whereas rail express and railroad rates are flexible, air express rates have been kept very rigid. It is common practice with Railway Express to set seasonal rates for agricultural products in the case of other transportation media, but in air express rates it was only recently that REA inaugurated special commodity rates for newspapers and racing forms. At present, Railway Express is also experimenting with special commodity rates, for a limited period, in certain areas. If this trial proves successful, it is possible that these special rates may be extended throughout the country.

In spite of the foregoing facts that tend to hinder the development of the use of air transportation for freight and express, there has been a steady increase in revenue from this source. In a compilation of annual reports by the Civil Aeronautics Board from 1935 to 1940, it is revealed that revenue from air freight represents 2.83 per cent of the total revenue earned. Table VI shows the actual revenue earned from express, compared to that from passenger travel, mail hauling, and other services rendered by the airlines, and Table VII shows domestic air carrier progress from 1935 through 1940.

Future Developments

With future developments, perhaps by 1950 or 1960, it is reasonable to assume that the present aerodynamic and economic problems will be solved to such an extent as to permit cargo planes of 100 tons, with useful load capacities of 40 tons or more, to operate at a lower cargo cost than Curtiss-Wright's costs based on a study of their 20-C cargo plane. When considering costs, of course, it must be taken into consideration the personnel angle. The Government's present pilot training program, through the military forces, CAA service units and other mediums, will bring into being a large number of trained pilots, first officers, maintenance, and operating men. There will be great technical advances, bringing into being cost-saving changes in structure, materials and fuels. All of these factors will help lower operating costs.

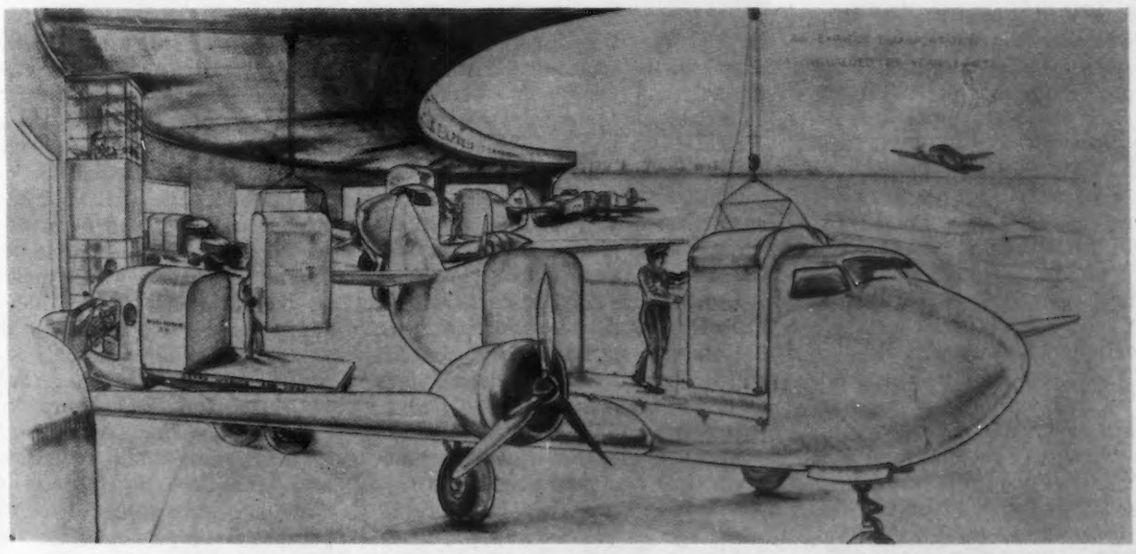
In a recent article*, Grover Loening, the noted aviation consultant, visualized the freight plane of tomorrow and its predictable effect on sea-borne trade. On the basis of the progress made during the past 14 years, he predicted a cargo plane with a pay-load of 50 tons. In comparing one of these 50-ton payload planes with the average 10,000-ton sea-going freighter, Mr. Loening estimated that under the present war conditions cargo vessels cannot make more than 10 trips a year across the Atlantic. By computing the average payload of a 10,000-ton freighter at 6000 tons, he estimated the 10 trips to mean a total of 60,000 tons of cargo.

* *National Aeronautics*, April, 1941.

"Now let us take a look at that 'predictable' 1955 aircraft," said Loening. "It can carry 50 tons of load to Europe 150 times a year, which by anybody's arithmetic is 7500 tons a year. As shocking as it may be to shipping men, it happens to be a fact that only eight of these little 1955 aircraft would be required to carry the payload of one freighter in a year!"

The average cost of a 10,000-ton freighter is $2,000,000. Placed in quantity production by 1955, Loening estimated that this "predictable" plane should cost about $300,000, or a total cost of $2,400,000 for the eight cargo planes necessary to carry an amount of freight equal to that carried by freighter. As for crews, Loening indicated that the eight aircraft would each be manned by a crew of four men, possibly three. On the basis of this estimation, it would take 24 men to run the eight planes. Even with a 100 per cent allowance for reserve crews, the eight planes would require, at most, 50 men, which compares favorably with approximately the same number of men needed to run a 10,000-ton freighter.

In conclusion, it must be admitted that air transportation, because of its ability to save time and dwarf distance, is pregnant with possibilities. The next phase of airplane operation is the development of cargo carriers. It is most unfortunate for our civilization that war and not peace is the means by which we are learning the intrinsic value of Wrights' invention —the airplane.



A container type cargo plane envisaged by Harlan Fowler. Courtesy American Aviation.

Drilling Hardened Parts

By L. G. BLACK
President, Black Drill Co., Cleveland

THE use of Hardsteel drills, developed during the past year as a salvage technique, is fast becoming a production process as well. Such drills have already eliminated expensive and unnecessary operations in hundreds of plants, and their use is spreading rapidly in every branch of the metal working industry.

Hardsteel drills, made by a secret process for which a patent is pending, are designed to drill, ream, countersink and counterbore hardened steel of any type, temper or analysis. That they will perform such tasks with a minimum of wear on the drills themselves has been proved in a wide variety of operations. They have been used successfully on carburized, oil hardened, water hardened, cyanided and nitrided pieces of high carbon, high chrome, and high speed steels of every degree of hardness. They have also performed a number of other unusual tasks, for many years thought impossible. They will penetrate fired porcelain without chipping it and without drawing their own temper or showing noticeable wear, and they will drill through baked enamel without cracking it. They will even drill sheets of pure carbon without difficulty, and will pass rapidly through plate glass.

These drills differ from conventional twist drills in several respects. The drill body does not have spiral flutes but is straight with a triangular cross section, thus providing chip clearance in a round hole. Point angle is 65 deg. instead of the standard 59 deg. (although a 68 deg. point is used for twist drills when cutting hard materials). For counterboring and flat bottoming work, the points are ground straight across. The only fluting is in the form of a short notch in the middle of each side, called a chip clearance groove. The drill cuts only on the bearing surface and not on the sides.

Originally Hardsteel drills were made for the purpose of reclaiming tools, dies and any hardened steel parts which could not satisfactorily be softened for machining purposes or which would be rendered useless by such an operation. There are countless examples of this use. A common one is the drilling of hardened steel air chambers in rebuilding pneumatic tools. Previously such a job would have involved annealing the piece, drilling it, rehardening it and then regrinding it to compensate for distortion. Such examples of salvage, however, are not the concern of this article, which will discuss production uses of Hardsteel drills.

During recent months, an increasing number of such uses have developed, and new ones are turning up each day. These range from relatively simple drilling problems (which cannot, however, be handled by ordinary twist drills) to the elimination of some very complicated and expensive machining processes made necessary by the previous lack of drills which would penetrate hardened steel.

Drilling Manganese Steel

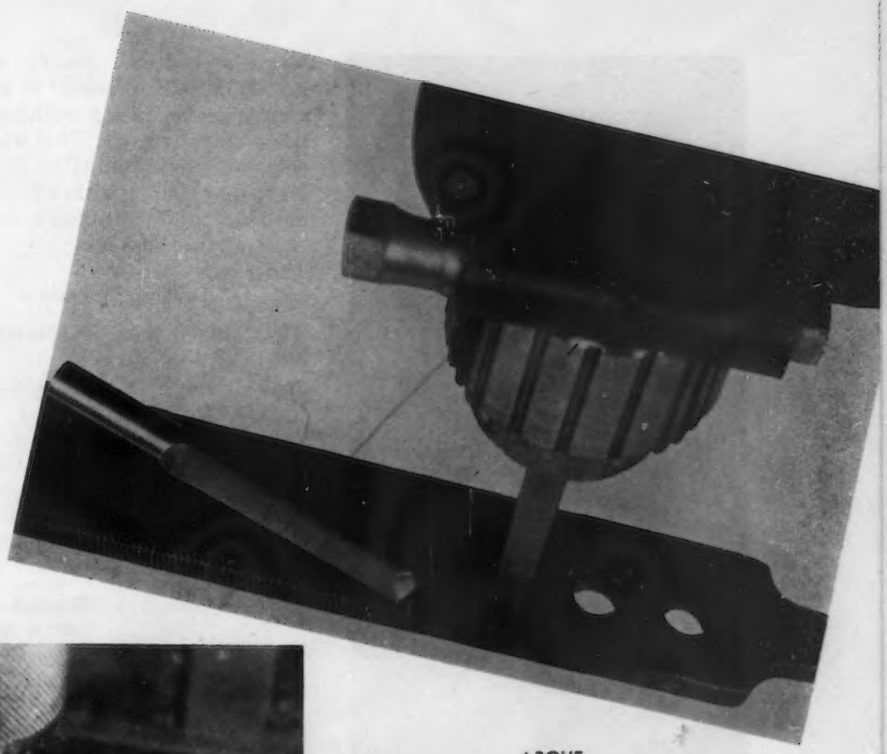
One of the simplest but most spectacular uses of Hardsteel drills is the drilling of link holes in manganese steel tractor shoes. In the plant of the Cleveland Tractor Co., a considerable number of shoes have been scrapped daily, due to the tendency of the metal to work harden.

On some shoes high speed steel twist drills would penetrate completely, on some they would penetrate partially and on others scarcely at all. In every case, tool life was extremely low, due to the austenitic qualities of manganese steel. The shoes would work-harden due to slippage of the drill point under heavy pressure, and in some cases would harden almost immediately to the point where the drill could go no farther. When the drills were unable to penetrate, it was found that their temper had been drawn and that they were therefore worthless for future work without major reconditioning.

Yet the same shoes offered no unusual resistance to Hardsteel drills. Not only were these drills able to penetrate all of the fresh manganese castings with ease, but they completed the drilling operation

without difficulty on the shoes which had refused to yield to the twist drills and which had holes with work-hardened bottoms. After drilling several such stubborn jobs, the drills showed no noticeable wear. This is true in the Hardsteel drilling of any analysis of manganese steel.

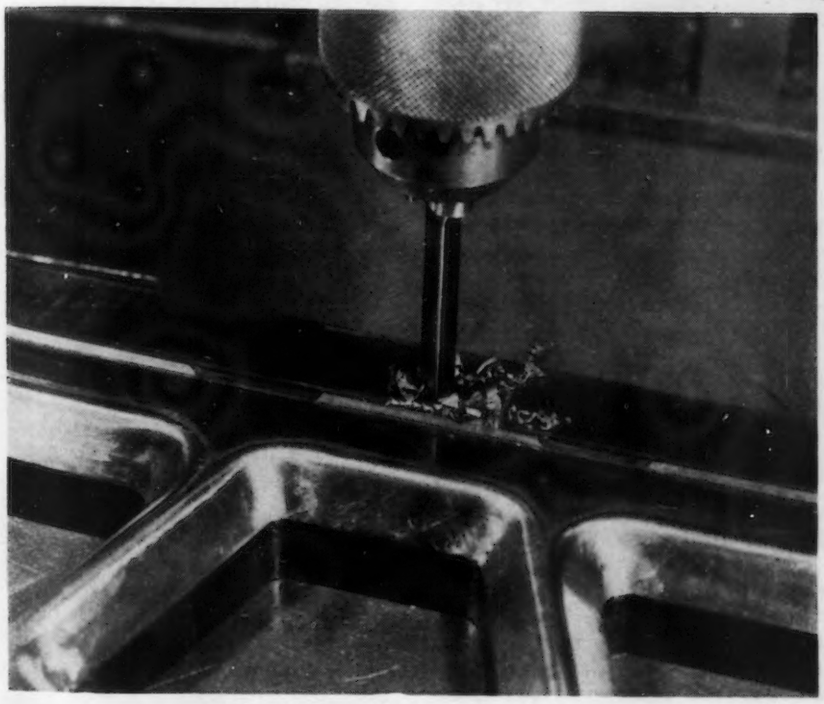
Much more common in the metal working industry as a whole is the problem of drilling and reaming a cored hole in a chilled casting. Ordinary drills and reamers will not cut this metal satisfactorily, and any tool used on the job in the past has had a very short life. Hardsteel drills do this job with ease in a single operation, and show very little wear in the process. It is difficult to say exactly where these drills are going to prove most useful, but it is safe to say that this application will be one of their major uses.



ABOVE

ONE of the simplest and most dramatic demonstrations of Hardsteel drill performance. The drill cuts through file steel with ease, leaving a smooth finished surface in the hole.

o o o



LEFT

ON this crimping die for producing aluminum mess trays for the Navy, the diemaker forgot to drill for the gage pins before hardening. This was done with a Hardsteel drill as shown, thus saving an expensive die from the scrap heap. On the stamping die for the same piece, the diemaker omitted to bore an air vent hole before the die was hardened. The vent hole was drilled in the hardened piece; otherwise the trapped air would blow up the piece when the punch was withdrawn.

o o o

Holes in Ball Bearings

A typical instance of the drilling of heat-treated steel occurred recently in a plant which had been baffled by the problem of putting holes in ball bearings successfully. The bearings were made of hardened chrome steel, SAE 52100, and in the past it has been necessary to dead soft spot anneal them, drill and then reharden. Unfortunately, the rehardening process distorted the metal, putting the holes out of true and necessitating a finishing operation besides. Hardsteel drills did this job without necessitating all these steps, and will drill hardened steel bearings of any analysis or heat treatment without annealing any part of the work.

One of the most unusual features of this and other drilling operations performed with these drills is that the hole is just as smooth as a burnished surface. There is no tearing of metal and the hole is finished when the drill is through the metal. Wall hardness is maintained within one or two points Rockwell C of the main piece when drilled without coolant. When cooled with water, absolute hardness is maintained.

A number of examples of new efficiency made possible by Hardsteel drills have occurred in the field of aircraft manufacture, where extremely hard steels are used in great quantities. In making camshafts for straight-in-line, V-type airplane engines, for example, the manufacturer rifle-drills the shaft to within 1 in. of the far end before hardening. The "plug" at the far end is left on for chucking for the grinding operation. In the past, after the piece was hardened the plug was ground off at considerable cost. Hardsteel drills made it possible for the shaft to be cut to final length,

THE hole which is shown being drilled with a Hardsteel drill had to be located in this locking collar for a shell threading machine after the piece was hardened. No ordinary drill could do the job. This is an example of how this special drill is changing the course of design and production in many industries.

drilled in the same manner before hardening, and then drilled through the plug, saving the expensive grinding operation.

An even more costly grinding operation occurred in an aircraft plant where the lower end of a push rod for a cam was being made of carburized steel. The ordinary procedure was to harden the piece, grind the rounded end (which was the only portion of the work which had to be hard), and then put the work, several thousand pieces at a time, in a Blanchard grinder in order to remove the hardened skin from the other end. This was done so that a hole for the push rod might be drilled in the soft steel core. It was necessary to grind off 1/16 in. of carburized steel, which was an extremely expensive and wasteful process, costing approximately $7500 annually in grinding wheels alone, to say nothing of the labor cost involved. This waste was completely eliminated by the use of Hardsteel drills, with which it was possible to drill through the hardened surface in 5 sec.

Drilling Procedure

No skilled help or special equipment is necessary in using these drills, though it is important that certain instructions and precautions be observed. The matter of speed is important. Generally speaking, recommended speeds are higher than for drilling mild steel with high speed steel drills. They are tabulated below:

Drill Size, In.	Drill Speed, R.p.m.
1/8	2000 to 2500
1/8 to 3/16	1600
3/16 to 1/4	1400
1/4 to 3/8	1200
3/8 to 1/2	900
1/2 to 5/8	800
5/8 to 3/4	700
3/4 to 7/8	600
7/8 to 1	500

The above speeds may vary somewhat according to the type of metal being drilled. If the drills do not function properly, higher speed should be used and then worked down to the proper drilling speed for the metal in use. It is highly important that these speeds be maintained under load and that the spindle does not slow up while working.

When first starting the drilling operation, sufficient pressure is applied on the drill point to cause the chips to curl at the point of the drill. After the chips start to roll away from the point, the pressure is lessened and only enough pressure maintained to keep the chips coming. Too much speed will cause a discoloration about the walls of the hole; too slow speed and too much pressure, on the other hand, have a tendency to cause the drill to bind and may result in breakage of the tool. In a freshly ground drill, the extreme point of the drill will flatten slightly on first application, but this is necessary to allow the drill to start cutting. Experience will quickly determine the balance between speed and feed, thereby prolonging tool life and controlling annealing.

The explanation of the fact that Hardsteel drills will not anneal hardened steel is that the heat generated by drilling is dissipated in the chips. Most drilling operations can be carried on dry, but in cases where it is necessary to maintain absolute hardness at the walls and to prevent any discoloration whatever, coolants may be used in two ways: In cases where the drill press is not equipped with a coolant pump, the entire vise and the piece should be submerged in a pan of water of sufficient depth to cover the work. When the press is equipped with a coolant pump, the water should be directed over the entire piece. A rust inhibitor may be added to the water.

When drilling in this manner it is important that increased speed be used to compensate for the cooling by the water. No speed table can be set up to regulate this operation because the increased speed is determined by the volume of water, the size and volume of the piece and by the character of the metal.

Hardsteel drills are not designed to work successfully in soft steel. Their application begins where the ordinary twist drill leaves off, and in cases where a piece of steel with a hard surface and a soft interior must be drilled, it is necessary to change to an ordinary drill for the soft steel operation.

THIS manganese steel tractor shoe resisted every effort to drill with ordinary twist drills. A Hardsteel drill readily cuts through this austentitic material, leaving a fine, burnished surface inside the holes.

Lubricant Selection for Ball Bearings

° ° °

FULLY appreciating the many factors involved in the selection of suitable greases for relubrication of ball bearings, over a period of several years, the Annular Bearing Engineers' Committee has been undertaking a research program from a chemical and mechanical standpoint. At first, the only greases available were of a lime soap base, which had limitations. In recent years, however, due to the troubles experienced by the ball bearing industry, much better greases for ball bearing application have been developed by many of the oil companies.

The standards which follow have been developed from practical experience and careful analysis by the Annular Bearing Engineers' Committee, but are subject to revision in line with developments in lubricants. Some lubricants which conform to these standards may not be suitable for all applications, and conversely some greases that do not conform may sometimes be satisfactory. For all applications, the user of the bearing is advised to obtain the approval of the grease manufacturers.

The ABEC has developed a grease testing machine for determining the physical characteristics of greases and a number of the properties called for in these standards are determined with this machine.

Greases for Relubrication of Ball Bearings

Operating Temp. Range Deg. F.	Speed Factor (Bearing bore in mm. x r.p.m.) Up to 75,000	75,000 to 150,000	150,000 to 300,000
— 10 to — 125	ABEC II*	ABEC I	ABEC I
32 to 150	ABEC II	ABEC I	ABEC I
60 to 200	ABEC II	ABEC I	No recommendation

No greases are recommended for operating temperatures below —10 deg. F. nor above 200 deg. F., nor for speed factors above 300,000.
For excessive moisture conditions, a water repellant grease may be required.
* ABEC I may be preferred for some applications.

Specifications	ABEC I	ABEC II
Worked penetration, ASTM, min.	190	260
ABEC Test, Running torque, gm.-cm.	60-300	60-450
Leakage through plate seal, max.	5%	20%
Grease left in brg., min.	75%	75%

Oxidation

Greases shall show no evidence of deterioration following 18 months' storage in bearings in individual sealed boxes or packages as indicated by oil leakage, hardening, gum formation of the grease or by loss of free turning by hand. Alternatively, the grease shall not increase or decrease more than 10 per cent in the ASTM penetration (measure of consistency) or in the drop point Shell Ubbelohde test. In the Norma-Hoffmann oxidation bomb test, following a 100-hr. run, not more than a 5 lb. drop in oxygen pressure should be noted from an initial pressure of 110 lb., using a 20-gm. sample at 210 deg. F. When tested under the same conditions with the addition of a piece of copper partially immersed in the sample, after 6 hr. exposure there shall be no evidence of stain of the copper strip nor any evidence of physical change in the grease.

Neutralization numbers made on grease samples before and after the 100-hr. accelerated oxidation test or 18-month storage test must not show a total change of more than the equivalent of 10 mg. of KOH per gm. of grease, nor shall the neutralization number following 100 hr. oxidation show acidity exceeding the equivalent of 5 mg. of KOH per gm.

ABEC Grease Standards

The accompanying table shows the application of the two ABEC standard greases. For both types, the greases shall be free from dirt, abrasive matter, filler, excessive amounts of moisture and free acid or free alkali. Soda or soda lime soap may be used, with maximum lime soap 5 per cent of total weight of grease, uncombined lime 0.10 per cent maximum. The ABEC tests listed in the table are made on the ABEC grease testing machine, drawings and specifications of which may be obtained from the Annual Bearing Engineers' Committee, 60 East 42nd Street, New York. Grease specification blanks may also be obtained from the same source.

Oil Lubrication of Anti-Friction Bearings

FRICTION torque in a bearing is lowest with a quantity of oil just sufficient to form a thin film over the contacting surfaces. Friction will increase with greater quantity and with higher viscosity of the oil. With more oil than just enough to make a film, friction torque will also increase with speed.

The energy loss in a bearing is proportional to the product of torque and speed, and will cause a rise in the temperature of the bearing and its housing. This temperature rise will be checked by radiation, con-

vection and conduction of the heat generated depending upon the housing design and the influence of the surrounding atmosphere. The rise in temperature will result in a decrease in viscosity of the oil and a decrease in friction torque, but soon a balanced condition will be reached.

In the selection of oils for ball bearing lubrication, two general considerations are dominant:

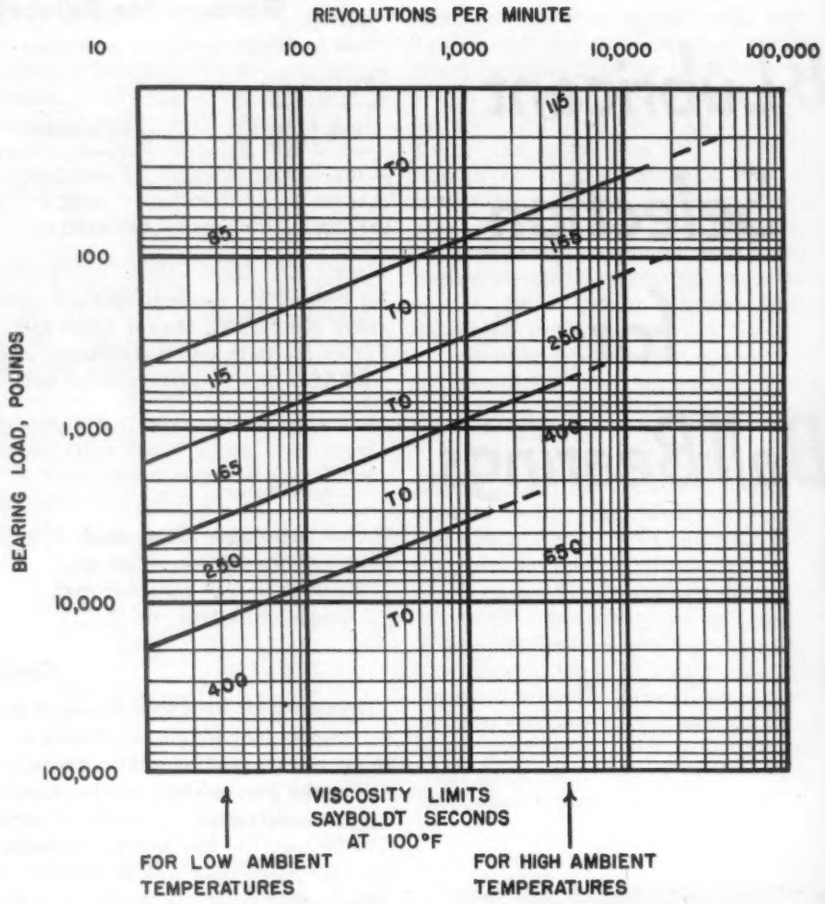
1. The desire to reduce friction to a minimum, which requires a small quantity of oil of low viscosity.

2. The desire to maintain lubrication safely without much regard for friction losses, which means using larger quantities of oil, usually of somewhat greater viscosity in order to reduce losses from evaporation or leakage.

In line with this second condition, the accompanying logarithmic chart has been made up for selection of viscosities of oil for various speeds and bearing loads. The sloping lines indicate viscosity groups for oils preferred for these loads and speeds. When ambient temperatures are low the lower viscosity ranges should be used and with high operating temperatures the higher viscosities should be selected. When bearings have to operate in a wide range of temperatures, an oil with high viscosity index should be selected.

In the great majority of applications, pure mineral oils are most satisfactory, but they should be free from contamination that may cause wear in the bearing and they should show high resistance to oxidation, gumming and to deterioration by evaporation of light distillates and they must not cause corrosion of any parts of the bearing during standing or the operation.

In special applications, various compounded oils may be preferred, and in such cases the recommendation of the lubricant manufacturer should be obtained.



Range of oil viscosities for any given load and speed condition.

Slags in Steel Production

CONCLUSIONS drawn from investigations relating to slags in iron production are discussed by F. Korber and W. Oelsen in a recent issue of *Stahl und Eisen*. An explanation of the use of the slag constitutional diagrams for studying slag viscosity is given, and particular reference is made to the effect of equilibrium and non-equilibrium conditions. Characteristics of the behavior of silica, phosphorus pentoxide, alumina, ferrous oxide, fluorspar and magnesia in slags and the conditions promoting the formation of a highly basic slag are pointed out.

It was established from the data collected that, with regard to the metallurgical effect of basic slags, the question of which compounds, pure lime, lime silicates or lime phosphates, with which they are to be saturated at temperatures normally attained and with given proportions of fluxes, FeO, Al_2O_3, and CaF_2, is critically important. Another fact established was that the close association that exists between the silica and iron contents of open hearth slags, and the sum of the contents of CaO, MgO, and MnO, expressed in percentages, can vary only slightly. In making steel with a basic slag, the saturation limits of the lime and its high melting point compounds are just as important factors as is the solubility of the silica in the silicate slags of the acid process.

A schematically developed FeO-V_2O_3 constitutional diagram is used to explain the peculiarities of vanadium slags. The high melting points of the compounds V_2O_3 and FeO-V_2O_3, and their consequent low solubility in other slags, afford an explanation of the fact that more vanadium passes into the slag from iron refined in the Bessemer than when it is treated with ore in the open hearth.

Constitutional diagrams, together with information from the text of the article, prove that lime ferrite in molten slags in contact with iron at elevated temperatures are unstable. Important factors affecting heat-balance calculations for iron smelting processes are pointed out.

Plastics in a Metal Plant

By W. F. SHERMAN
Detroit Editor, The Iron Age

. . . When plastics began to encroach on the metal specialties field, this 30-year-old metal working plant decided to install a plastics department, and in doing so retained many of its metal parts customers that were turning to parts made of plastics.

IN the large industrial field that includes many fabricators of "resale" parts, those parts that lose their identity when incorporated into other manufacturers' products — plastics have to a measurable degree at least, replaced certain of the more expensive and highly finished metal parts of various assemblies. The trend has not been important in the field now served by mild steel, but has been especially marked in the area normally covered by stainless, monel, plated materials and those finished with "fancy" paint or lacquer. This has been disturbing to the supplier of such metal parts because it has generally represented a decrease in the volume of his business.

The Metal Specialty Co., Cincinnati, decided more than three years ago that if there was "handwriting on the wall"—even a little—it should investigate it. Whatever it might have seen written there, this 30-year-old firm took up a suggestion that it take a step into the field of manufacturing molded plastic parts.

The new experience of this stamping concern constitutes a case history that is the more interesting because of current interest in substitute materials and alternate processes to replace those not available because of shortages and priorities. It might be said in passing that after three years of operating a plastics division, the firm finds about 10 per cent of its production being done in this department, and the trend continues upward; the other 90 per cent remains metal stampings. So far, defense-spurred substitutions for thermoplastics seem to be few in number, most of the changes from metal to plastics having been made for divers other reasons.

This stamping plant in making a partial transition into the plastics field had to choose process, materials, equipment, personnel, plant—and even types of product and customer—to fit in with its major function of supplying specialized pressed metal parts. Otherwise its new division might become just another plastic molding plant engaged in the bottlecaps-and-buttons business. Here arose the necessity of choosing between compression molding and injection molding.

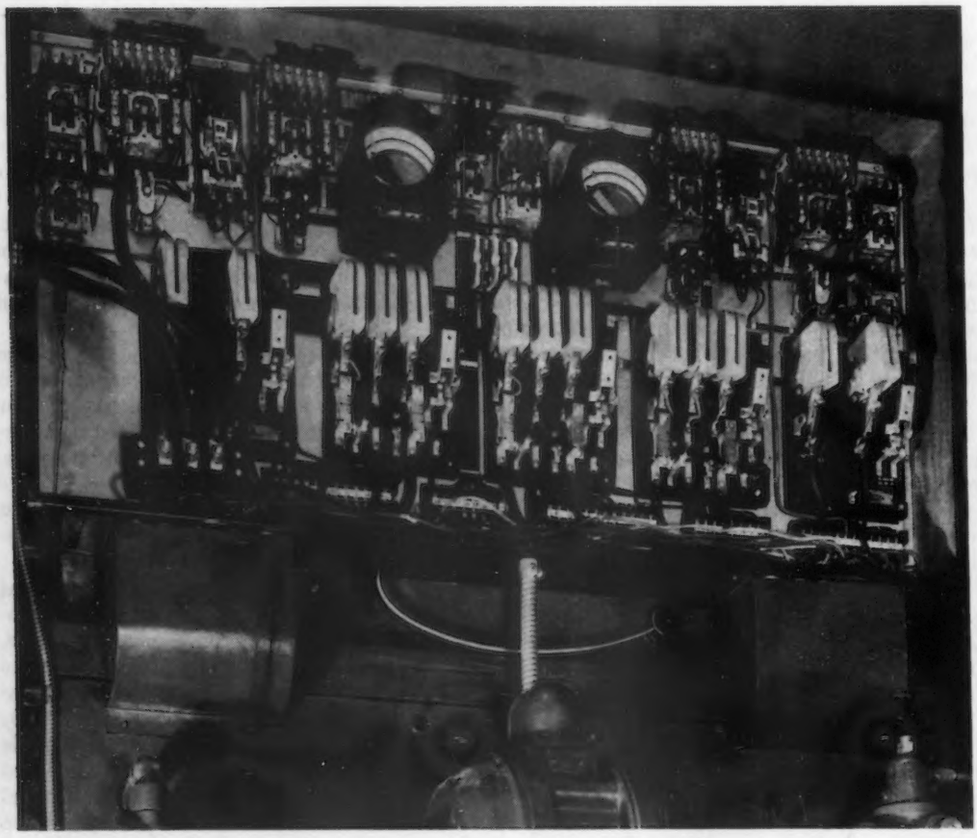
The former process makes use of such plastics as bakelite and durez (phenol-formaldehydes) or beetle and plaskon (urea-formaldehydes), all thermosetting plastics, which are heat reactive. These have great tensile strength and electrical insulating and heat resisting value.

The latter process is a somewhat newer one which employs thermoplastics like tenite I, plastacele, lumarith (cellulose acetate), tenite II (cellulose acetobutyrate), crystalite, lucite (methyl methacrylate), and polystyrenes. These are made plastic by heat but undergo no chemical change, so scrap material is not wasted. Impact strength, in

o o o

CLOSE-UP of the 250-ton press with 18-oz. capacity and double nozzle injection is the largest used by the Metal Specialty Co. in its plastics department. Here a "Capcolite" gasoline pump lens frame is molded. This part in plastic requires little attention, but when made of metal it had to be frequently painted.

o o o



THE control panel of the 18-oz. double nozzle 250-ton injection molding press is one of the many reasons for the need of a capable electrical engineer on the staff. The electrical equipment is not to blame for trouble that occurred in the change-over from metals to plastics, but is shown as a point requiring expert and special attention.

o o o

general, is higher for these than for the compression molded materials.

Comparison of the two possible methods in this case showed that the thermoplastics, with injection molding, offer the speediest method, that the available materials come in a greater variety of colors and with greater clarity, and that the process presents the greatest opportunities for making various shaped parts. Lesser tensile strength was found to be not an important deterring factor, since the original metal parts had been designed, in most cases, for appearance and utility, rather than for strength.

On this score, further justification for the choice is seen in the fact that an important customer is now using plastic parts made 75 per cent by injection molding, whereas three years ago its requirements were met 80 per cent by compression molded parts. This is said to be indicative of a trend to the use of injection molded parts.

Moreover, the speedy injection process and the kinds of product it makes possible were considered as most nearly paralleling the metal pressing efforts of the company.

Experimental efforts during a six-month period provided a background of experience before commercial production of plastics was attempted. This, plus three years of successful operation, presents data from which certain conclusions are reached.

The participation of this stamping plant in plastics manufacture seems to have been found highly desirable from the customer viewpoint because it makes possible an impartial appraisal of each problem before any choice is made between metals and plastics. The list of concerns supplied by the new division has been largely drawn from the list already being supplied by the pressed metals division and in this way prevented metal customers from pulling away.

The most valuable asset of the metal working plant was its die department and its 32 years' experience making metal dies within tens of thousandths of an inch accuracy for deep-drawn work. Since entering the plastics field, the company has made all of its molds but three and intends to make all molds from now on. Molds are being made of oil-hardening die steel, principally Carpenter Steel Co.'s Stentor and Extra No. 11.

Five presses are used, with a variety of sizes available up to a 250-ton press that has 18-oz. double nozzle injection capacity. Maximum sizes and capacity are determined largely by the possible clamping pressures. Mold halves must be held together during the injection cycle because any spread or opening of the dies results in undesirable flash, as well as spoils the accuracy and shape of the part. In the experience of the Metal Specialty Co., hydraulic clamps have been found best. Auxiliary equipment numbers about 11 pieces, including preheating ovens, an automatic hot leaf stamping machine, table and belt sanders (wet and dry), buffing wheels, grinders, etc.

Major problems encountered in production are those connected with electrical controls on the presses. The equipment itself is not blamed especially, but the multiplicity of

o o o

OIL CUP
ALUMINUM COIN CUP FOR PARKING METER
PLASTIC COIN CUP (TO REPLACE ALUMINUM CUP)
CONTROL KNOB FOR UNIT AIR CONDITIONER
REFLECTOR LENSE FOR COMMERCIAL AND ARMY TRUCKS
REFLECTOR LENSE FOR ARMY TRUCKS
PETROLEUM TAPE GAUGE HOUSING
3 CLOSED CAR DOME LIGHT SWITCH BUTTONS AND PLATES (COUPES AND SEDANS)
ELECTROSAVER
10 9 8 7 6 5 4 3 2 1
FAST FREEZE NORMAL VACATION OFF/DUST OFF
RADIO DIAL INDICATOR ARROW
"KONITE" WRIST WATCH STRAP BUCKLES AND KEEPERS
REFRIGERATOR CONTROL DIAL

A VARIETY of parts made by the Metal Specialty Co., which has both a metal and a plastic working arrangement. The parking meter cup shown at the top was made of aluminum until priorities banned the material. The plastic coin cup at the right replaces it.

o o o

adjustments and potential trouble spots sometimes result in stoppages. Among other electrical controls are those governing speed of opening and closing of the dies, timing of the cycle, heating (melting) of the plastic, flow rate and temperature of the fluid material.

Presence of a capable electrical engineer on the staff is rated by Arnold Tietig, III, head of the plastics division, as an important requirement. In addition, personnel must include practical mold engineers and molders capable of working from the inception of design, through the mold-making stages, to the finished product.

A clean plant and clean atmospheric conditions are prerequisites to the production of plastic moldings with good finished appearances. Because of this a stamping plant where lubricant or dirt is likely to get into the raw plastic materials or soil the molds would not be a satisfactory plant for molding plastics. Light stamping or blanking operations can be carried on in the same building with molding of plastics without difficulty. In this case, after experimental work had been completed, the firm started operations of the plastics division in a separate plant nearby at Richmond, Ind.

Typical of the parts made in the plastics division is a gasoline pump lens frame which might ordinarily be made of two stamped or rolled halves. These pieces, forming a rim around the identifying part of the gas pump, require frequent repainting in service when made of steel, so some time ago they were changed to plastic, being made then as compression moldings duplicating the previously stamped parts. Recently it was decided to mold these by the injection method, partly because cleaner and more translucent materials are available for use with this method as well as material that is more weather-proof.

The compression molds were converted to the injection job by providing sprues, gates, risers and injection nozzle guide cups. After a test run with this converted die mold, the mold was reworked to be returned temporarily to the compression molding job, while new dies were made for production running in the injection machines.

Frequently dual engineering service is offered by this organization that is both metal-working and plastics-molding. A purchaser of coin receptacles for parking meters wanted light-weight plastic cups, but it was demonstrated to him that a coin-laden plastic cup was subject to damage if dropped. As a result of this advice, the cup was made of drawn aluminum until shortages of that material forced a change. Now the cup is being molded of plastic, but probably only as an expedient.

Other plastic parts being made by the Metal Specialty Co., are wrist watch strap buckles, replacing brass, plastic gage bodies with clear plastic openings for dials (these are used on oil pipe lines where die cast gages could not be read without opening a cover), automobile and truck tail lamps and safety marker lights, switch button controls for interior lights in automobiles, specialties in the plastic jewelry line particularly compacts and cigarette cases, and large dashboard control panels for airplanes. A very colorful line of air-conditioner, radio, and refrigerator parts round out a prolific line of products. Customers have found it beneficial to have one company available for their needs in metal or plastics or both.

Hydrogen and Flake Formation in Steel

METHODS of evaluating the effect of the hydrogen content, solubility, and permeability on hair-line crack formation in steel were recently described in *Stahl und Eisen* by H. Bennek and G. Klotzbach. In determining the hydrogen content, melting the specimen with tin is considered more advantageous than any of the other procedures known, the limit of error being limited to ± 0.25 cc. of hydrogen per 100 gm. of sample for a sample weight of 20 gm. In determining the permeability of steel to hydrogen, a complicated apparatus was developed by the authors, which, with modifications, was also used in evaluating the solubility of hydrogen in steel.

Data obtained with this device for solubility and permeability up to 1100 deg. C. of various carbon steels from 0.3 to 1 per cent and 1.5 per cent, and alloy steels. The alloy steels examined were mainly of four types: (1) 1 per cent carbon and 1.5 per cent chromium, (2) 0.2 to 0.3 per cent carbon, 0.7 per cent chromium, and 3.5 per cent nickel, (3) 0.1 to 0.2 per cent carbon, 1.5 per cent chromium, 4 per cent nickel, and 1 per cent tungsten, and (4) 18 per cent chromium and 8 per cent nickel.

It was determined that the hydrogen evolution rate at room temperature is dependent on the material structure, while the alloy composition as such is of secondary importance in low alloy steels. At temperatures up to 1500 deg. C., the permeability is affected by the structure. With the exception of the austenitic chromium-nickel steel, all those examined showed about the same hydrogen solubility at high temperatures. After quenching to room temperature, however, the hydrogen contents of specimens saturated at high temperatures became very different, believed to result from differences in the course of the permeability curves.

Continuing the discussion, the authors cover the relations between the hydrogen content and the liability to flake formation, and the minimum amounts of hydrogen are stated, which under certain working conditions lead to flake formation. Reasons are given for the effect of the hydrogen content, permeability, and solubility on hair-line crack formation; also explanations why certain heat treating methods induce crack formation, and recommendations for their suppression.

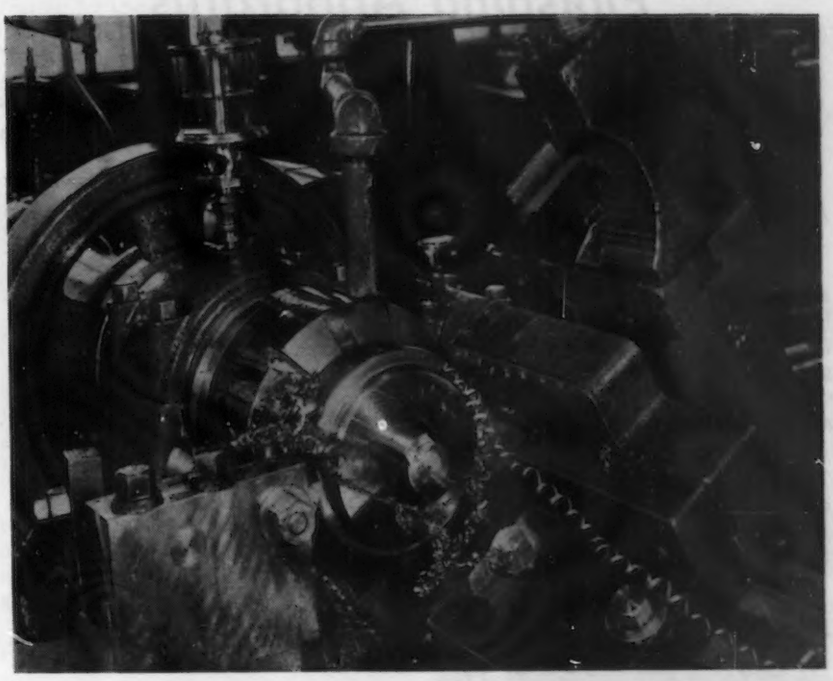
Single Spindle Automatics

Adapted For Larger Work

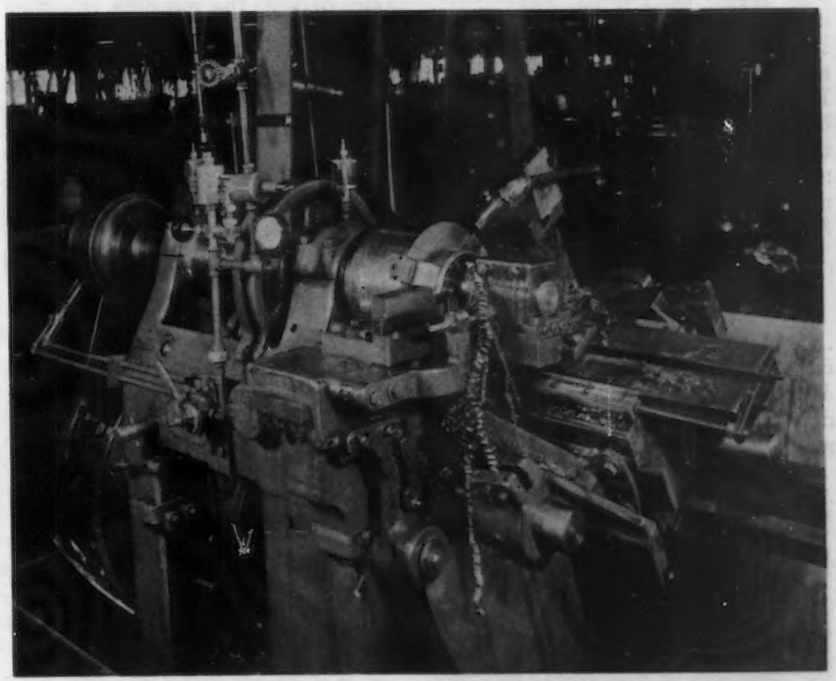
CONFRONTED with the problem of speeding up production of 3¼ to 10 in. o.d. bearings for tanks and trucks and at the same time of having to throw out of production many smaller size machines used up until now for making roller bearings for the passenger car industry, Timken Roller Bearing Co. proceeded to adapt some of this latter machinery for larger work. Timken engineers found that 40 single spindle automatics with a nominal capacity of 3¼ in. could be retooled to do all the forming operations on bearing rings up to 8 in. diameter. They were not capable, however, of handling the cut-off of the larger tubes. So 20 heavy duty single spindle automatics which had been producing completed parts were set aside to make ring slugs only for the small machines.

The conversion involved the removal of the old feeding and chucking mechanisms. Three-jaw, air operated chucks were applied after all bearings had been replaced and the machines thoroughly overhauled. Production now proceeds in three steps: Slugs are cut on the larger machines, the o.d. is turned in one set-up and the i.d. in the other, since two different types of chucks must be used for these secondary operations. Ordinarily, of course, the piece would be rough machined in a single set-up, with cutting off from the tube stock the final operation.

Despite the fact that the three operations are now performed on separate machines, the 40 rebuilt machines plus the 20 heavy duty automatics assigned to cut-off work produce as many finished pieces in a given time as 80 of the heavy duty machines completely tooled up for this operation are capable of doing. Naturally, the parceling out of operations among three different machines entails an increase in cost, but happily it is surprisingly small, considering that production of these larger size bearing rings *at any cost* was the primary objective and that utilization of existing facilities had to be made because of the delivery situation on new machine tools.



BEFORE conversion, this single spindle automatic bar machine had a capacity of 3¼ in. By the addition of a pneumatic chuck and other modifications it is now capable of chucking and turning bearing rings up to 8 in. o.d.



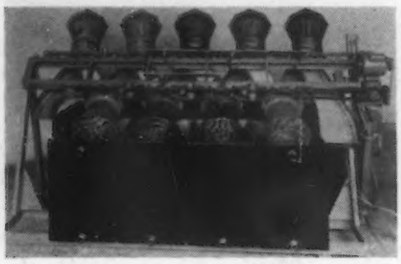
ONE of the single spindle converted automatics set up for internal boring of the tapered race and facing one end. The taper turning attachment may be seen at the front, as well as the pneumatic chuck, its piping and controls.

New Equipment . . .

Finishing Apparatus

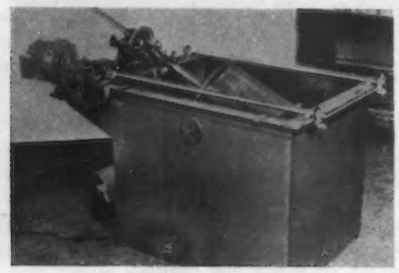
Some of the recent developments in plating, cleaning, and degreasing apparatus, polishing, burring, and other finishing machines and accessory equipment are described herein.

THE development of a full automatic barrel cleaning and plating machine for small parts in bulk has been announced by the *Udylite Corp.*, Detroit. The parts are automatically and progressively subjected to the various cleaning, rinsing, pickling, plating, and drying operations without manual handling, eliminating from 8 to 10 hand operations, reducing man-hours in plating operations and permitting considerable savings in material costs. The entire machine is driven by one motor. Different batches of parts are given the same treatment, the process is timed and cannot be tampered with, and the machine is shipped by the manufacturer complete and ready for installation.



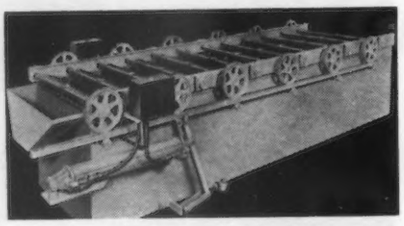
Oblique Plating Barrel Drive

A NEW and improved oblique plating barrel drive has been developed by *Hanson-Van Winkle-Munning Co.*, Matawan, N. J., driven by a 1/6-hp. motorized worm gear reducer which is suitably mounted on the tank, ready for connection to power lines. The barrel can be furnished with a wooden tank, asphalt lined; or a steel tank, unlined or lined with 3/16 in. vulcanized rubber. The cylinder is of bakelite construction with disk or button type contacts; or of hard rubber with disk type contact only. The panels in the bakelite cylinder are $\frac{1}{8}$ in. thick, and $\frac{1}{4}$ in. thick in the rubber cylinder.



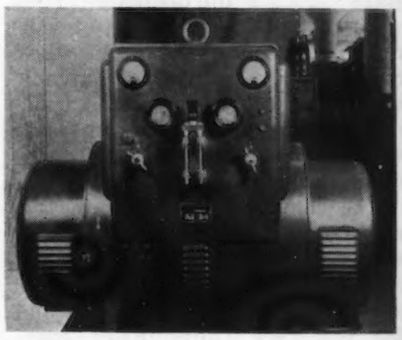
Parkerizing Machine

A NEW automatic parkerizing machine capable of processing large quantities of small parts, such as 0.30 and 0.50 caliber steel machine gun links, rifle clips, small gun parts, and other parts that require such finish, has been developed by *Udylite Corp.*, Detroit. Of the hopper type, air or hydraulically driven, the machine is loaded with parts in batches at one end and the parts are progressively transferred through the cleaning, rinsing, parkerizing, baking, and oiling processes. Each batch remains a separate unit throughout the cycle and cannot be mixed with another. Savings in manual labor, man-hours of work, and material costs are claimed, and each batch of parts is given the exact treatment designated by the time clock on the machine.



Anodizing Machine

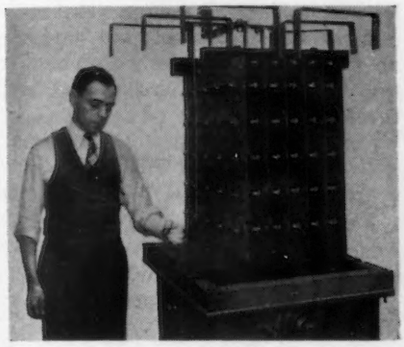
MOTOR GENERATOR CORP., Troy, Ohio, has announced a complete line of anodizing machines available from 125 to 875 amp., at 20, 40, and 50 volts, d.c. Motor sizes range from $7\frac{1}{2}$ to 55 hp., generating from 5 to 35 kw. Each machine is furnished with control cabinets for anodic treatment of aluminum and aluminum alloys for the Alumilite, Bengough-Stewart, or Bureau of Standards processes. Features of these machines include: Constant speed with constant voltage and close control over the entire current range; positive voltage regulation with continuous capacity with high overall efficiency; and compact single unit construction. Units have separate exciter, an ammeter with shunt voltmeter, exciter and generator field rheostats; double pole, single throw work circuit switch; positive and negative terminal studs; and across-the-line switch giving overload and undervoltage protection to the motor.



Selenium Rectifiers

THE *International Telephone & Radio Mfg. Corp.*, New York, announced a new line of selenium rectifiers, ranging from outputs of 150 milli-amp., d.c. at 12 volts to oil-immersed units supplying an output of 1000 amp. at 6 volts. Although applicable to a wide variety of industrial applications where low voltage d.c. is to be obtained from a.c. sources, the units have wide

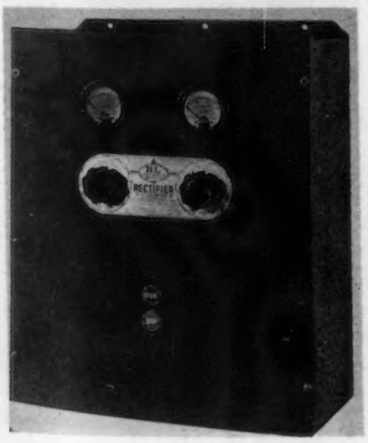
use in plating circuits. Groups of selenium rectifier plates are assembled on insulated studs to form any desired rating, current supply and circuit arrangement. The high per-



missible plate temperature and the high permissible reverse voltage result in fewer plates as well as smaller and lighter assembly units. The life of this type of rectifier is practically unlimited. The units are obtainable from the Selenium Rectifier Division of I. T. & T.

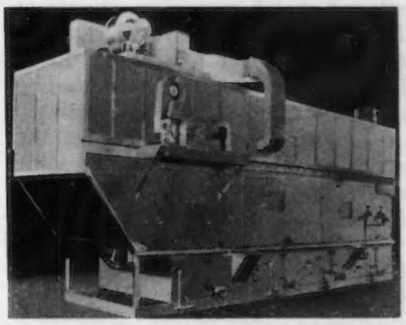
Rectifier Voltage Regulator

A VOLTAGE regulator to be used in conjunction with its line of metallic rectifier electroplating units has been developed by *Benwood Linze Co.*, St. Louis, and is designed to provide a convenient and simple means for adjusting the voltage output of each individual or bank of rectifiers. Hand operated, the unit has 64 adjustment steps, giving a voltage range from maximum down to 1 volt. Also, a start-stop station is provided, giving control of each tank, and a voltmeter and an ammeter record current and voltage of each rectifier. This method provides the convenience of individual tank rheostats, but eliminates the rheostat losses of bus bar control.



Aluminum Processor

A TWO-STRAND, cross-rod, conveyorized Detrex processing machine for cleaning and treatment of aluminum, aluminum parts, and other metal parts, has been designed by the *Detroit Rex Products Co.*, Detroit. It follows an approved U. S. Army and British procedure for aluminum alloy sheets used in aircraft to make them less pervious to atmospheric conditions and to



provide a better paint bond. The machine incorporates hot alkali wash, hot water rinse, hot chromic acid dip, hot water rinse, and oven drying. The machines are built to individual requirements.

Shell Casing Cleaner

NEW Mercil type equipment for washing, pickling, and rinsing 20 mm. shell casings after annealing has been developed by

Hanson-Van Winkle-Munning Co., Matawan, N. J. One of two recent installations has a Mercil type rotary cleaning unit with a loading compartment, is motor driven, and is equipped with an exhaust hood for the cleaner tank. The pickling unit consists of a double station, hot sulphuric pickling tank, a spray rinse compartment, a cold rinse compartment, and a final hot rinse compartment. The pickling, spray, and warm rinse compartments are lead lined, and the unloading hopper is made of Monel metal with ½ in. perforations. The Monel cylinders, 16 in. in diameter, 30 in. long hold from 600 to 700 shells.

Bearing Drier

FLEXIBLE steel bearings are dried quickly and thoroughly at the Harris Products Co. by a novel drying equipment developed by *General Electric Co.*, Schenectady.

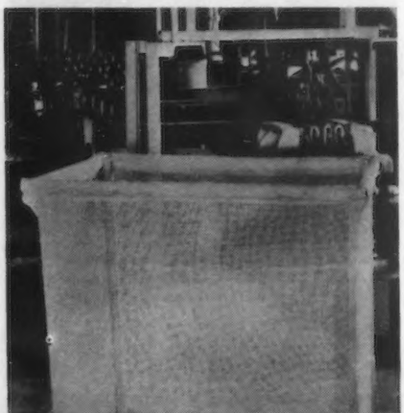
After a petrolatum coating is washed from the bearings in a strong soap solution, the bearings are placed on a screen tray which fits the top of a box-like affair. Air from a GE 5000-watt forced convection unit heater is then blown into one end of the enclosing box, and passes up through the parts on the screen tray, quickly and effectively drying as many as 50,000 bearings per day.

Degreasing Solvent

THE *Curran Corp.*, Malden, Mass., announced a new mineral grease and dirt solvent, called Gunk X-11, to be used either concentrated or diluted for large open cleaning tanks or vats. It is offered as a substitute for trichlorethylene vapor phase metal cleaning, particularly in heavy duty automotive or similar applications where there is considerable insoluble dirt or smut to be removed. The solvent not only takes the cling out of hard mineral dirt and grease, but emulsifies them, so that they may be quickly rinsed away by sluicing with a water spray. A rectangular tank of at least 300 gal. capacity may be used, or standard vapor degreasing tanks can be converted to the new solvent digestive and emulsifying methods.

Plating Tank Nets

NETS, to be placed in plating tanks to catch any work that is dropped, made of ½ in. stretched mesh, hung square, six thread medium twine, made to any specified dimension, has been announced by *Hanson-Van Winkle-Munning Co.*,



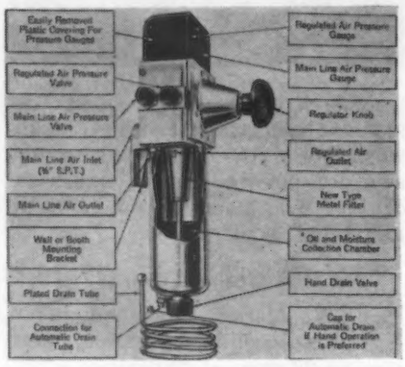
Matawan, N. J. These nets can be used in nickel, cyanide copper, Mazic zinc, acid zinc, and cadmium solutions, but are not suitable for alkaline cleaners or sodium stannate tin solutions.

Tank Mixer

A NEW V-belt drive Lightning top entering mixer, permitting mixing from the top on open tanks, closed tanks, pressure or vacuum vessels, and for attachment to standard size nozzles, has been developed by the *Mixing Equipment Co.*, Rochester, N. Y. Mixer speed can be changed by changing the sheave and pulleys or a variable speed pulley can be provided on the motor that allows about 25 per cent speed variation. Since the speed can be varied from 400 to 600 r.p.m., this drive is suitable only for propeller type impellers and not for turbines. The V-belt drive on these mixers can be furnished with electrically conducting belts to do away with danger from static electricity in hazardous locations, and can be furnished with oil resisting belts. Units range in size from 1 to 25 hp.

Oil and Water Extractor

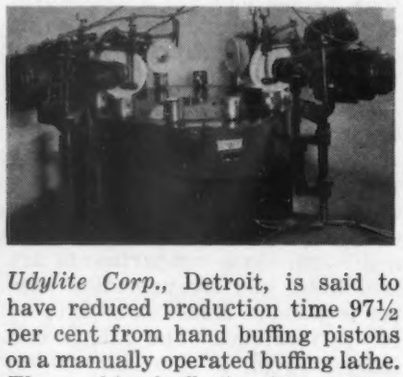
BINKS MFG. CO., Chicago, announced a new large capacity oil and water extractor, known as Binks E-75, with a rated capacity of 75 cu. ft. per min. at 60 to 70 lb. pressure, and has two main line air outlets as well as two regulated air outlets. Designed to meet the needs of a large capacity extractor and ample to handle the air needs of several modern spray guns at


Easily Removed Plastic Covering For Pressure Gauges
Regulated Air Pressure Valve
Main Line Air Pressure Valve
Main Line Air Inlet (¾" S.P.T.)
Main Line Air Outlet
Wall or Sloth Mounting Bracket
Plated Drain Tube
Connection for Automatic Drain Tube
Regulated Air Pressure Gauge
Main Line Air Pressure Gauge
Regulator Knob
Regulated Air Outlet
New Type Motel Filter
Oil and Moisture Collection Chamber
Hand Drain Valve
Cap for Automatic Drain if Hand Operation is Preferred

low or high pressure, the new unit incorporates a new air cleaning principle with a highly efficient metal filter that does not impair free air flow. Another outstanding feature is the more uniform air pressure, resulting from the improved air regulator built into the unit.

Piston Polisher

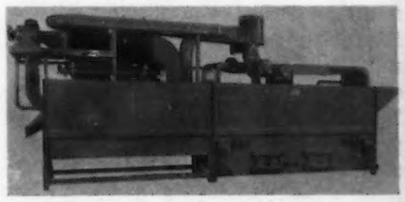
AN automatic polishing machine for buffing aluminum aircraft engine pistons, developed by the



Udylite Corp., Detroit, is said to have reduced production time 97½ per cent from hand buffing pistons on a manually operated buffing lathe. The machine buffs the sides and top of the pistons in 15 sec., and has a chuck table in indexes automatically. Twelve chucks hold the pistons which rotate during the operation. Buffing pressure is adjustable so that the buff rides over the work with a uniform pressure. The machine may be adapted to a variety of circular parts merely by changing work holding chucks or fixtures.

Cartridge Cleaner

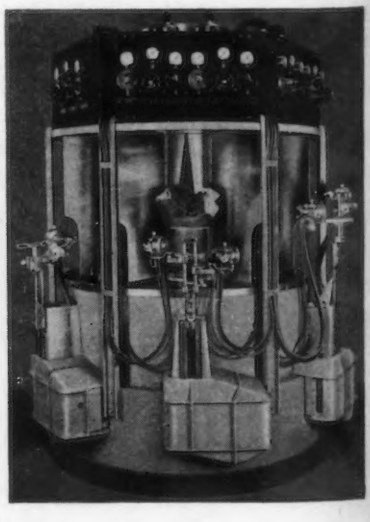
SMALL cartridges, as well as other small parts, can be washed, rinsed, soaped, and dried in a new drum type washing machine recently announced by the *Alvey-Ferguson Co.*, Cincinnati.



Made of corrosion resisting metal, the indirect gas-heated dryer is automatically kept at proper temperature. A large quantity of cartridges may be dumped in the loading hopper at one time and the machine automatically feeds itself at the proper rate of flow. The discharge chute has a gate which permits accumulation while the offbearing trucks are being changed.

Metallizing Machine

A MACHINE with six stations, each controlled by reducing gears and fully adjustable to various motions and speeds, has been developed by *U. S. Galvanizing & Plating Equipment Corp.*, Brook-



lyn, N. Y., in collaboration with *Metallizing Engineering Co., Inc.*, Long Island City, N. Y. It eliminates many former hand metal spraying operations on aircraft cylinders, and assures accurately and consistently applied metal coatings. Cylinders are loaded at the first station, and then indexed to stations Nos. 2, 3, 4, and 5, and loaded and inspected at the sixth station. From 30 to 40 complete cylinder assemblies per hr. have been turned out on this machine, completely sprayed with aluminum or other corrosion resistant metals.

Automatic Polisher

A ROTARY automatic polishing machine for handling a wide variety of circular pieces, such as aluminum pistons for aircraft engines, fuse bodies, and engine valves, has been developed by the *Hammond Machinery Builders, Inc.*, Kalamazoo, Mich. Consisting of a circular aluminum table over a heavy cast-iron base, with automatic indexing on the table and six to eight rotating chucks, the machine is claimed to save time and materials, and produce better finishes faster. Buffing or polishing wheels may be adjusted to any angle. Speed changes are easily made both in spindle revolutions and number of table indexes per hr. The polishing wheels are driven independently. One operator can handle the machine on full production.

Rust Remover

HANDLING, long exposure, storage, and hauling, in spite of all precautions, permit iron and steel to become rusty, waterstained, dirty, and fingermarked. In some instances it is necessary that all such accumulations be removed and the surface left chemically clean. Rusticide "50" is designed by the *Rust-I-Cide Products Co.*, Cleveland, to remove all accumulations even to the point of giving the surface a mild etch, upon which the finish can cling firmly. The cleaner also unites with the metal itself, forming a new surface that is passive and resistant to corrosion.

Polishing Lathe

ADAPTABLE to many jobs now being done on conventional lathes, a new foot-operated speed lathe, developed by *Walker-Turner Co., Inc.*, Plainfield, N. J., has found many uses covering polishing, burring, and lapping ferrous and nonferrous metals and plastics. It will chuck rounds, tubing, and hexagonal shapes up to 2 in. in diameter. The lathes are equipped with three-phase motors in direct drive or gear drive types, a foot pedal controls the motor switch and a synchronized brake brings the spindle to an instant stop when the motor circuit is broken. The units are available with either Jacobs chucks in ½ or ¾ in. capacity, or with a 4-in. three-jaw universal lathe chuck. Speed ranges from 950 to 7200 r.p.m.

Metal Coating

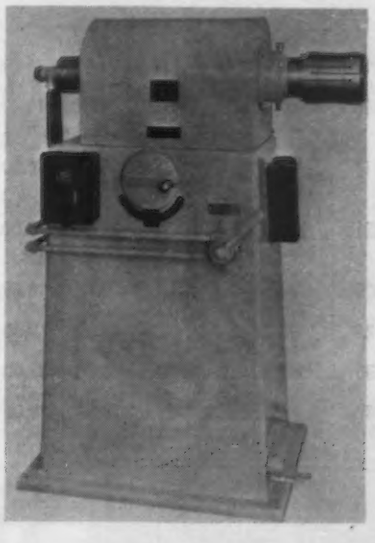
A NEW metal coating compound, marketed under the name of Amco metallic coating powder, Brand K, has been developed by the *American Solder and Flux Co.*, Philadelphia. Designed for making repairs to damaged tin coatings, the coating matches perfectly with hot dipped tin. The coatings are completely rust resistant and since the melting point of the coating is lower than tin, the original coating is not melted or disturbed by application.

Plating Temperature Control

A DUPLEX recording temperature controller, air-operated, for controlling both heating and cooling of chromium plating baths, with a range from 50 to 150 deg. F., and a 24-hr. chart revolution, has been developed by the *Foxboro Co.*, Foxboro, Mass. Proper temperature control is required for quality control of bright chromium plating, since bath temperature slightly too high will produce a dull, lusterless plate, and low temperature may cause uneven bath throwing power or result in hydrogen embrittlement of steel, with cracking resulting. The Foxboro controller has two control pointers which establish the temperature limits at which the steam and water valves for heating and cooling are automatically operated. With these controls there is no chance for operators to forget to shut off the steam valve.

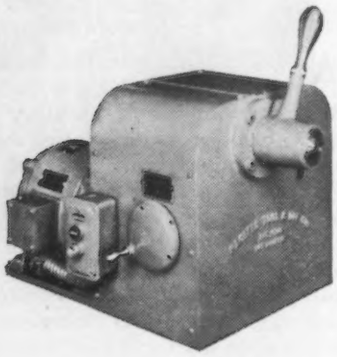
Engine Barrel Polisher

DESIGNED for polishing and finishing engine barrels on aircraft engines, a new type variable speed lathe, equipped with an air operated expanding mandrel for holding the work, has been developed by the *Schauer Machine Co.*, Cincinnati. This type lathe



Polishing Lathe

AN improved second operation machine, known as the Pacific Vera-Lathe, with an infinite number of variable spindle speeds from 1250 to 5000 r.p.m., with a hollow spindle design and a novel collet operating mechanism, has been introduced by the *Pacific Tool & Die Co.*, Los Angeles. Designed especially for polishing, buffing, burring, filing, sizing, finishing, and lapping round parts, an outstanding feature of the machine is the collet operating mechanism on the front end of the spindle which saves a great amount of time by permitting the spindle to rotate while the work is inserted into the collet, and eliminates wear and tear caused on machines that must be stopped to chuck the work.



Infra-Red Heat Lamp

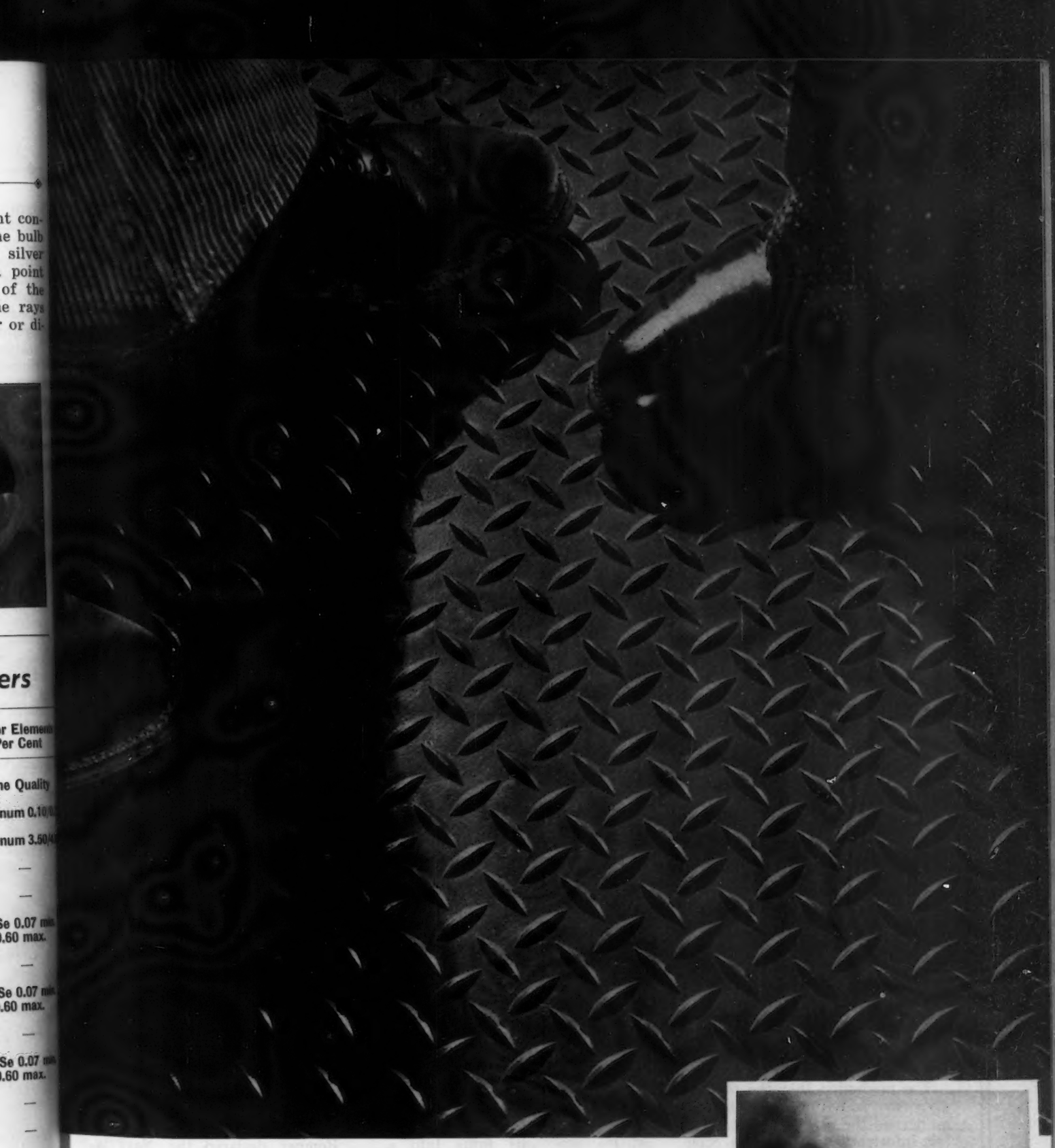
A NEW type "bullseye" infra-red heat lamp, developed by *Wabash Appliance Corp.*, Brooklyn, N. Y., is claimed to be the first commercial type of radiant heat lamp whose design and construction make practicable 100 per cent control of heating efficiency. The bulb has a ring lining of pure silver sealed inside the bulb at a point just below the focal point of the filament, thus projecting the rays directly against the reflector or directly on the work.

Composition Ranges of Standard Stainless Steel Type Numbers

Type No.	Carbon Per Cent	Chromium Per Cent	Nickel Per Cent	Other Elements Per Cent
301	Over 0.08/0.20	16.00/18.00	6.00/ 8.00	Mn 2.00 max.
302	Over 0.08/0.20	17.00/19.00	8.00/10.00	Mn 2.00 max.
302B	Over 0.08/0.20	17.00/19.00	8.00/10.00	Mn 2.00 max. Si 2.00/3.00
303	0.20 max.	17.00/19.00	8.00/10.00	Mn 2.00 max. S or Se 0.7 min. Mo 0.60 max.
304	0.08 max.	18.00/20.00	8.00/10.00	Mn 2.00 max.
308	0.08 max.	19.00/22.00	10.00/12.00	Mn 2.00 max.
309	0.20 max.	22.00/24.00	12.00/15.00	Mn 2.00 max.
309S	0.08 max.	22.00/24.00	12.00/15.00	Mn 2.00 max.
310	0.25 max.	24.00/26.00	19.00/22.00	Mn 2.00 max.
311	0.25 max.	18.00/20.00	24.00/26.00	Mn 2.00 max.
316	0.10 max.	16.00/18.00	10.00/14.00	Mn 2.00 max. Mo 2.00/3.00
317	0.10 max.	17.50/20.00	10.00/14.00	Mn 2.00 max. Mo 3.00/4.00
321	0.10 max.	17.00/19.00	8.00/12.00	Mn 2.00 max. Ti 4 x carbon min.
325	0.50 max.	7.00/10.00	19.50/23.50	Cu 1.00/1.50
329	0.20 max.	23.00/28.00	2.50/ 5.00	Mo 1.00/2.00
330	0.25 max.	14.00/16.00	33.00/36.00	—
347	0.10 max.	17.00/19.00	8.00/12.00	Mn 2.00 max. Cb 8 x Carbon min.

Type No.	Carbon Per Cent	Chromium Per Cent	Nickel Per Cent	Other Elements Per Cent
403	0.15 max.	11.50/13.00	—	Turbine Quality
405	0.08 max.	11.50/13.50	—	Aluminum 0.10/0.
406	0.15 max.	12.00/14.00	—	Aluminum 3.50/4.
410	0.15 max.	10.00/14.00	—	—
414	0.15 max.	10.00/14.00	2.50 max.	—
416	0.15 max.	12.00/14.00	—	S or Se 0.07 min. Mo. 0.60 max.
420	Over 0.15	12.00/14.00	—	—
420F	Over 0.15	12.00/14.00	—	S or Se 0.07 min. Mo 0.60 max.
430	0.12 max.	14.00/18.00	—	—
430F	0.12 max.	14.00/18.00	—	S or Se 0.07 min. Mo 0.60 max.
431	0.20 max.	14.00/18.00	2.50 max.	—
440	Over 0.12	14.00/18.00	—	—
441	Over 0.20	14.00/18.00	2.50 max.	—
442	0.35 max.	18.00/23.00	—	—
446	0.35 max.	23.00/30.00	—	—
501	Over 0.10	4.00/ 6.00	—	—
502	0.10 max.	4.00/ 6.00	—	—

The above table includes the latest revisions of the American Iron and Steel Institute as of February, 1942. No specific composition limits within the above range should be placed on types 301, 302, 302B and 303, except that carbon may be specified to a four point range within the above limits.



When safety means so much . . . Around America's big guns and in plants fighting the battle of production, "A.W." Rolled Steel Floor Plate prevents costly slipping and falling accidents. Saves man hours when time is short. Every step is a safe step on "A.W." Floor Plate. Fire-proof, heat-proof, oil-proof, crack-proof. Easy to clean, quick to drain. No maintenance expense.

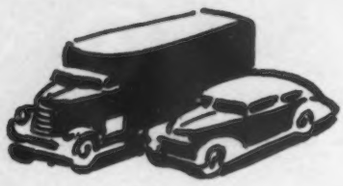
ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PA. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

Courtesy U. S. Army Signal Corps

Assembly Line . . .

• Product divisions becoming more active in industry's war effort and may take steps to avoid duplication of special facilities . . . Kanzler reveals progress toward all-out conversion.



DETROIT—The product divisions of the industry's Automotive Council for War are beginning to be more than mere agencies to interchange information about tanks, bombers, engines and other war materials. The growth of the product divisions since their establishment just a few weeks ago has been of interest to everyone who wanted to see how the industry's program of co-ordination and cooperation would work out.

The product divisions were a special group set up soon after the Automotive Council was established. The first division, announced Dec. 31, was called the aircraft engine committee, but since that time the new units have been more appropriately given such labels as tank division, airframe division, etc.

The prediction that the product divisions' activities are going to go beyond the point of interchanging information on methods came from George Romney, managing director of the Automotive Council, who said recently that "where existing facilities are capable of producing common requirements, the fewest number of sources will be used, subject to approval of the services in order to reduce tooling requirements." Romney also declared that the product divisions will deal extensively with the question of materials requirements which may prove to be one of the limiting factors in the industry's war production effort.

Of course, the immediate concern of the product divisions will be the expediting of 100 per cent conversion of automotive facilities to armament manufacture. But the enlarged scope of the divisions' activities would indicate that steps will be taken to avoid the much-feared duplication of certain special facilities.

HOW far the program will actually go is not known definitely because only time and circumstances can answer all of the questions. Whether, for instance, the tank division would undertake to standardize on a single power plant for the M-4 tank would depend, in part, on the amount of existing facilities for power plant manufacture, the desirability of various proposed engine designs, and the final decision of the Army on whether it wanted a single standardized power plant or several concurrent types.

It is of importance, however, that the product divisions are displaying a willingness to undertake the discussion and solution of problems that are so broad and important in their nature. It is even more to their credit that they will undertake to double-up on the use of existing facilities, as Romney indicated they would. Such efforts will really carry out the spirit of the industry's plan for pooling efforts and equipment to help win the war.

The product divisions of the Automotive Council For War Production represent one of the four principal avenues along which the automotive council has approached the problem of changing the industry over from a group of competitive peacetime firms into a single unit of the nation's war industry. The other activities of the Council are the machine tool and equipment service, tooling information service and contract information service which previously have been discussed on these pages. The functions of the Automotive Council and its four divisions have been described "as a method of aiding work looking for machines, and machines looking for work, coupled with production and technical services to insure the maximum use of every industry facility on the most efficient basis."

Romney described in some detail the procedure being followed by war contractors in making use of the industry's pooling of machines and equipment. Since any war contractor is eligible to dip into the pool for needed machines and equipment, the procedure should be of general interest. The initial step when new war projects are undertaken is to develop a list of machines and equipment which will be required. This list is broken down on the following basis: (a) pilot line requirements, (b) requirements for 50 per cent balanced production rate, and (c) requirements for 100 per cent balanced production rate.

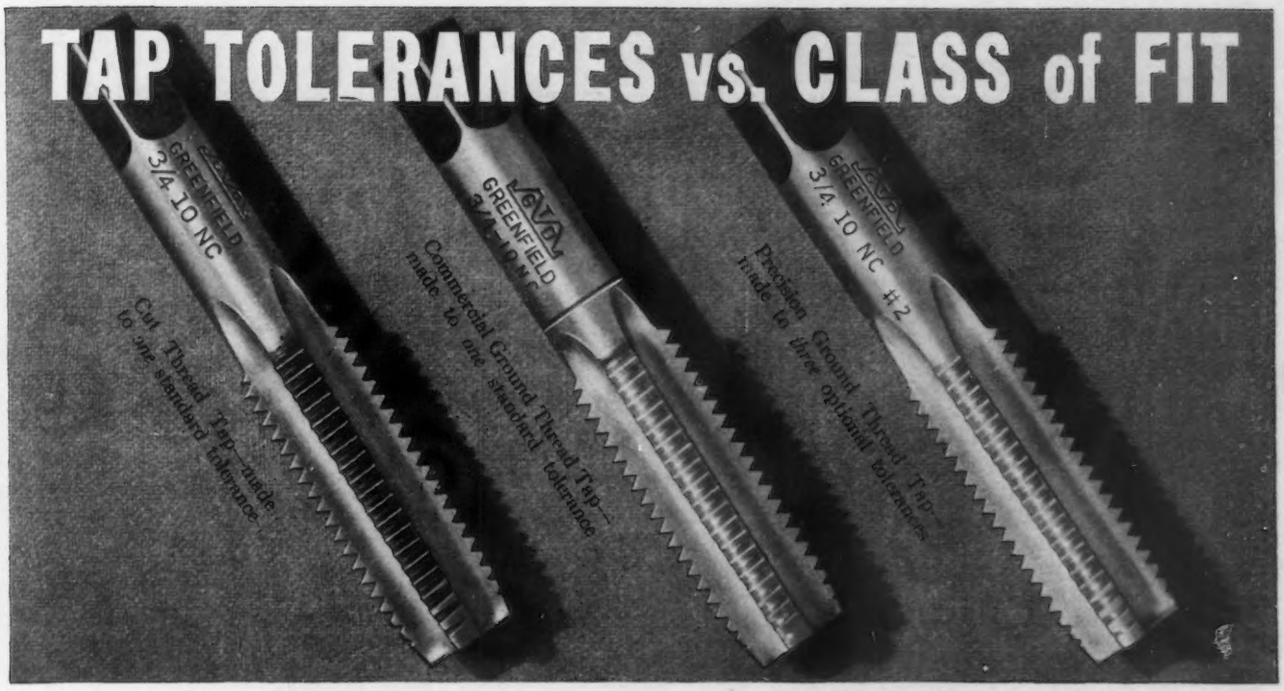
THE following steps are then taken: (1) The organization holding the contract for the project endeavors to locate competent contractors which have machine tool equipment available that will fit pieces or assemblies of the project, (2) it reviews its own available machine tools and assigns to the new project every machine reasonably adaptable to the project, (3) if there are other plants or organizations in the same company, it reviews the parent company's available machine tool list and secures assignments to the project of other machines reasonably adaptable to the job, (4) reviews the Automotive Council's list of available machine tools and secures assignment to the project of every machine on this list that is reasonably adaptable to the job, and (5) only machines still remaining on the project list after the above process has been completed are to be acquired outside the industry.

Romney declared the Navy is now requiring firms with new war projects to follow this procedure. He added that the automotive division of the War Production Board is also relying on the listing service.

This report and summary were presented before members of the Society of Automotive Engineers which is participating, especially in activities of the product divisions, in an engineering advisory capacity.

A further progress report is one

TAP TOLERANCES vs. CLASS of FIT


GTD GREENFIELD 3/4 10 NC
Cut Thread Tap—made to one standard tolerance
GTD GREENFIELD 3/4 10 NC
Commercial Ground Thread Tap—made to one standard tolerance
GTD GREENFIELD 3/4 10 NC #2
Precision Ground Thread Tap—made to three optional tolerances

A common source of confusion in tapping is failure to distinguish between CLASS of FIT as applied to the PRODUCT, and PITCH DIAMETER LIMITS as applied to PRECISION GROUND THREAD TAPS. The cause of this confusion doubtless is the fact that both terms involve the use of a similar, but not identical, series of numbers, and that the corresponding numbers have no direct relationship.

CLASS of Work FITS or "Screw Thread Assemblies" are:

No. 1—"Loose" No. 2—"Free"
No. 3—"Medium" No. 4—"Close"

Optional Pitch Diameter LIMITS or TOLERANCES of Precision Ground Thread Taps are: No. 01, No. 1, No. 2.

The table at the right indicates the taps which normally will produce Class 2 and 3 Fits, the ones most commonly used. Ordinarily, when using Precision Ground Thread Taps it is best to determine what screw assembly fit is required, then the Tap to produce threads for that fit may be selected by trial from the optional tolerances available.

Size	Threads per Inch			Class	
	NC	NF	NS	2	3
1/4	20	..	..	Cut	CG
	..	28	..	Cut	PG 2
5/16	18	..	..	Cut	CG
	..	24	..	Cut	PG 2
3/8	16	..	..	Cut	CG
	..	24	..	Cut	PG 2
7/16	14	..	..	Cut	CG
	..	20	..	Cut	CG
1/2	13	..	..	Cut	CG
	..	20	..	Cut	CG
9/16	12	..	..	Cut	CG
	..	18	..	Cut	CG
5/8	11	..	..	Cut	CG
	..	18	..	Cut	CG
11/16	..	..	11	Cut	CG
	..	..	16	Cut	CG
3/4	10	..	..	Cut	CG
	..	16	..	Cut	CG
7/8	9	..	..	Cut	CG
	..	14	..	CG	CG
	..	..	18	CG	CG
1	8	..	..	Cut	CG
	..	14	..	CG	CG
1 1/8	7	..	..	Cut	CG
	..	12	..	CG	CG
1 1/4	7	..	..	Cut	CG
	..	12	..	CG	CG
1 3/8	6	..	..	Cut	CG
	..	12	..	CG	CG
1 1/2	6	..	..	Cut	CG
	..	12	..	CG	CG

Size	Threads per Inch			Class	
	NC	NF	NS	2	3
0	..	80	..	PG 1	PG 1
1	64	..	..	PG 1	PG 1
	..	72	..	PG 1	PG 1
	..	..	56	PG 1	PG 1
2	56	..	..	PG 1	PG 1
	..	64	..	PG 1	PG 1
3	48	..	..	CG	PG 1
	..	56	..	CG	PG 1
4	40	..	..	CG	PG 1
	..	48	..	CG	PG 1
	..	..	36	CG	PG 1
5	40	..	..	CG	PG 1
	..	44	..	CG	PG 1
6	32	..	..	CG	PG 1
	..	40	..	CG	PG 1
8	32	..	..	CG	PG 1
	..	36	..		PG 1
10	24	..	..		PG 1
	..	32	..	Cut	PG 1
12	24	..	..	or	PG 1
	..	28	..	CG	PG 1
14	..	..	20		PG 1
	..	..	24		PG 1

SYMBOLS

CUT—Cut thread taps, either in carbon or high speed steel.

CG—Commercial ground thread taps in high speed steel. See Standard Tables.

PG—Precision ground thread taps.

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

More detailed information on this whole subject may be found in "*Greenfield's*" free book "FACTS ABOUT TAPS AND TAPPING." Send for a copy.

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD • MASSACHUSETTS

GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONTARIO

GTD GREENFIELD

TAPS • DIES • GAGES • TWIST DRILLS • REAMERS • SCREW PLATES • PIPE TOOLS

issued by Ernest Kanzler, chief of the Automotive Division, WPB, who summed up his presentation in the words "The automotive industry is well on its road to all-out conversion."

KANZLER cited the wage stabilization agreement reached last week in a conference with Sidney Hillman and representatives of labor and management on the subject of wages in the tool and die shops of Detroit. An agreement in principle was reached at the conference, it was announced. This agreement is expected to open the way for training and upgrading more tool and die workers. This is the problem to which we referred in these pages on Feb. 13.

As a result of the Hillman-sponsored agreement, it was estimated that some 15,000 tool and die makers in captive shops would get raises of 10 to 25 cents an hour, depending upon rates which will be agreed upon later. Practically, this will represent a widening out of the differential that has existed for years between rates paid in captive shops and rates paid in independent shops.

Kanzler's WPB division has initiated a program of charting the commitments made by the automotive industry on war work and the progress toward complete conversion. This charting is based on dollar volume, but other factors also have been taken into account. As explained by Kanzler, the Automotive Branch has divided the companies comprising the automotive industry into four groups. Group A consists of the Big Three passenger car manufacturers; Group B consists of six other passenger car manufacturers; Group C consists of 41 truck manufacturers; and Group D includes the various suppliers in the automotive industry.

As an example of how far the industry has already progressed, Kanzler stated that 122 firms out of 152 in Group D reported Jan. 29 that they had a total of 36 million square feet of floor space, of which 19 million were now occupied by war work. With existing contracts these firms will use 24 million square feet. In 1941, at peak automotive production, they employed 173,000 people. Now they have 94,000 at work, or 54 per cent of their peak. When tooling is completed on contracts now on hand, they will employ 154,000, or 89 per cent.

THE dollar output of these companies presents a somewhat different picture. In 1941 the peak monthly production was $111 million dollars. Now their output rate is $53 million dollars per month, or 48 per cent of the peak. But at full capacity on present war orders, these firms will turn out goods valued at $116 million dollars per month, or 104 per cent of their 1941 production. Thus, even before they get back to peak employment, these firms are going to be turning out more products than they ever did before, at least in terms of dollars.

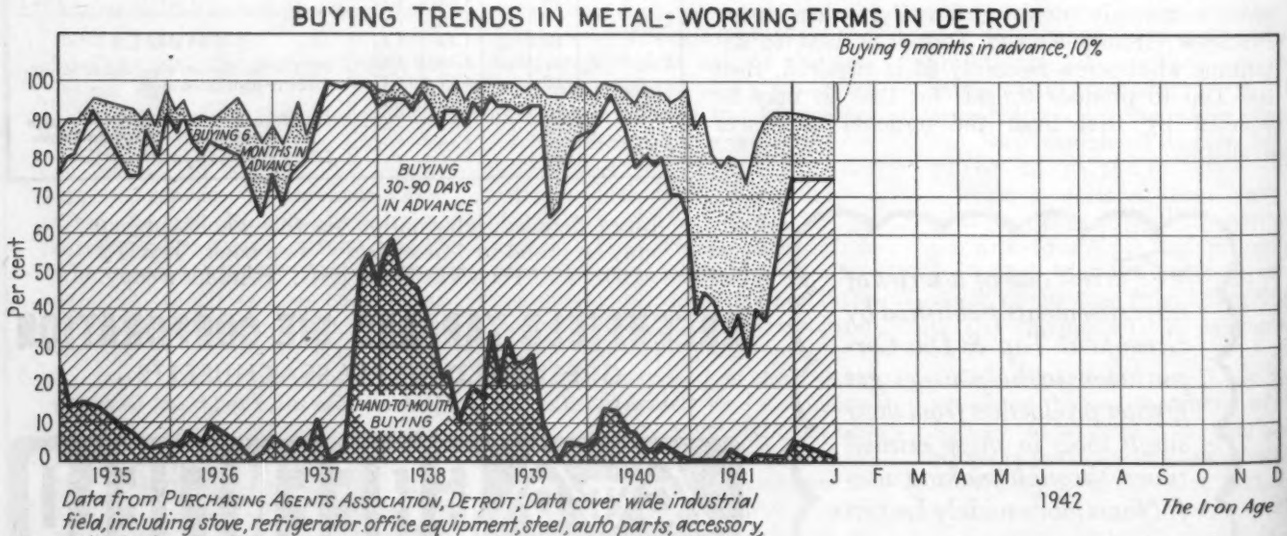
Kanzler also analyzed the commitment of General Motors, Chrysler and Ford, showing that when they are producing at full capacity on their present orders they will be running at the rate of $10,500,000,000 per year. This rate is 250 per cent in excess of what these companies produced in 1941. He added that the Big Three will need outside help in manufacturing and will have to buy about 40 per cent of the total from outside sources, in addition to approximately doubling their own fabrication.

"The engineers and production planners of these larger companies require time to digest the contracts placed with them during January," Kanzler said. "They need time to figure out just what parts should be bought outside. They need time to figure out with what companies they can place their sub-contracts. Normally such contracts would be placed with their regular suppliers."

Kanzler said significantly: "With this great bulk of 'Big Three' orders in prospect (for the subcontractor) it is unwise to make extraordinary efforts to overload the 122 companies from which we have just received figures to date and which show they already are heavily commited to war work. These companies have been the normal suppliers for the Big Three."

Incidentally purchase orders placed with suppliers during January by the Big Three for war products amounted to $545 million dollars, Kanzler said.

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Data from PURCHASING AGENTS ASSOCIATION, DETROIT; Data cover wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory, auto plants, and all armament materials

That's what you get in PORTER DIESELS

Porter Diesel Electric Locomotives are *proving by performance* that they are tops on the toughest haulage jobs. Heavy welded steel trucks and main frames, and modern rugged construction throughout assure users of maximum operating and maintenance economy per ton moved.

Get the full story on the modern Porter Diesel Electric Locomotives. Porter Diesels are built in a range of sizes from 25 tons to 80 tons. (Illustrated above is a typical 65 ton double power plant unit).

Before you consider a locomotive let Porter Engineers recommend the size and type that will best suit your particular hauling job.

PORTER "better built" locomotives

ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES FOR INDUSTRY

H. K. PORTER COMPANY, INC.

PITTSBURGH, PENNSYLVANIA

CHICAGO NEW YORK

Washington . . .

• As result of comprehensive survey taken on Form PD-275, modification of priority and allocations systems is definitely expected . . . Recapitulation of this census material to be made soon.

WASHINGTON—A more precise adjustment of the priority and allocation systems, which may be considerably modified, is definitely expected by WPB as a result of the comprehensive survey covering 10,000 manufacturers regarding metal requirements for second quarter. The survey has just been completed by the Bureau of the Census. This census, taken on Form PD-275, embraces the same information as that asked for under the Production Requirements Plan and is the first of the kind ever made. It is so broad that it blankets completely the steel industry, its supplying sources and the users of its multiplicity of products. Despite the Niagara of figures and facts, it is expected the material will be recapitulated by the second or third week of March.

Taken with all other reporting forms, and particularly PD-25-a, WPB hopes to be able to see the priority and allocation picture more clearly. It will then have a better idea about the flow of individual fabricated products from the plants to their final destination, whether they wind up as a plow point or a battleship plate. Producers were asked to show preference ratings against deliveries which have been and will be made.

MORE specifically, WPB is trying to learn the end use of a particular product so as to enable the board to tabulate the demands for the item, by both civilian and military requirements, and then to determine as a matter of policy how much should be allocated to each group. Thus WPB, not satisfied with existing statistics upon which are based materials and limitation orders, resulting in haphazard guesses, at best, is attempting to make its action more scientific and accurate.

The survey covers shipments, unfilled orders and requirements. It asks for information on shipments of each class of product by quantity and value by preference ratings for the October-December, 1941, quarter and similarly an estimate of the April-June, 1942, shipments. Request is made for data on unfilled orders as of Jan. 31, 1942. Figures on total anticipated requirements for the second quarter of the current year, together with inventories as of Sept. 30 and Dec. 31, 1941, and consumption for the last quarter of 1941 are also asked.

The nature of raw materials incorporated in the various manufactured products and the end use of the latter, particularly whether the products are for civilian or military use, must be shown.

Examples of product classes cited are: Edge tools, insulated wire, radio receiving sets, industrial lift trucks, brass screws, portable electric tools, automobile trailers and combat tanks.

IN general, WPB said, the more distinct and homogeneous the product class is, the more useful will be the information.

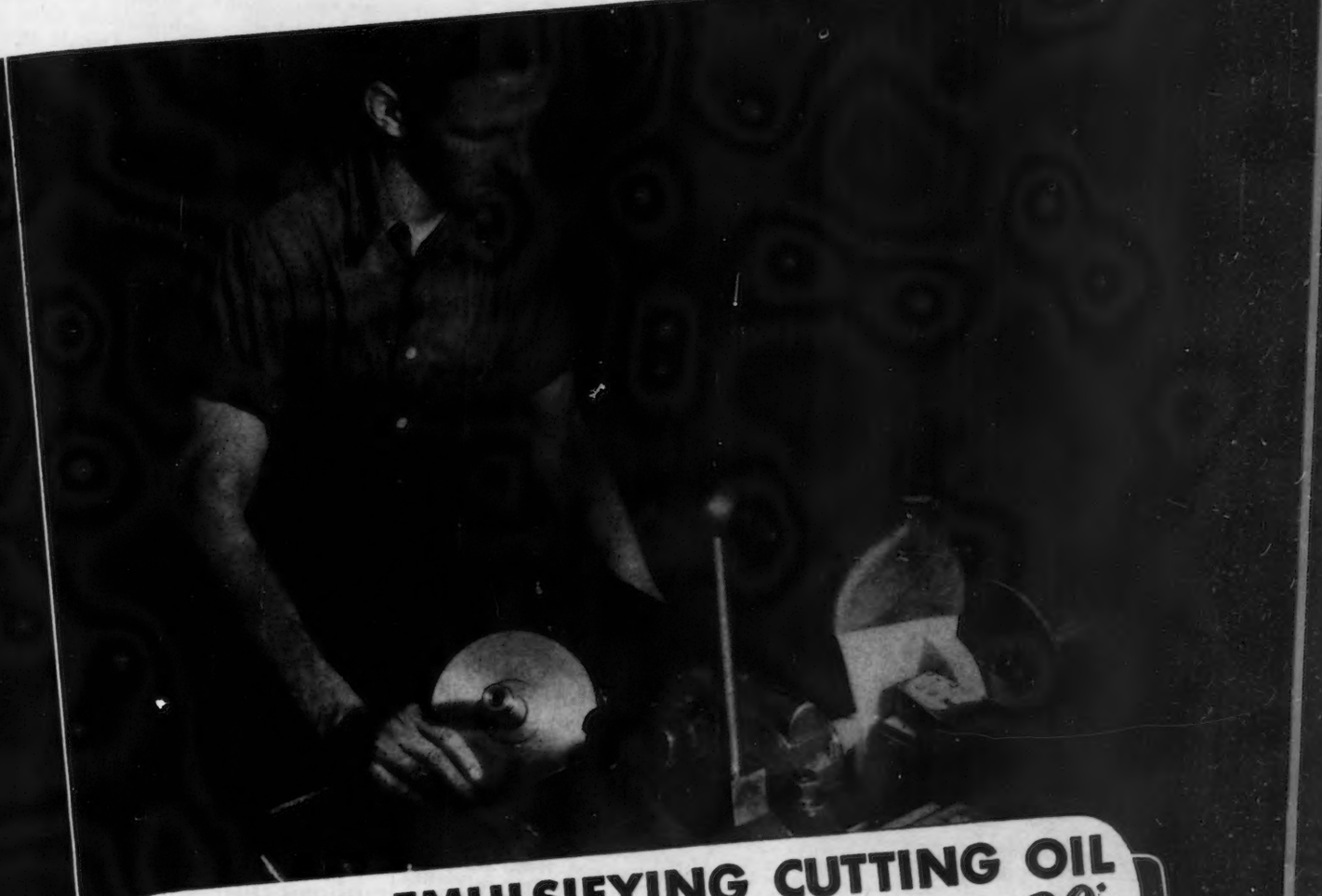
The matter of providing some of the information was made optional. A detailed showing of individual preference ratings and end use requirements was called for if such information was readily available and hence was made optional. An outstanding example of classification by industry for end use is that part of the survey covering 1941 last quarter shipments for the Army, Navy, Maritime Commission, and aircraft and machine tool manufacturers. To indicate what is meant by end uses a manufacturer whose principal customer is the petroleum industry was required to show that the end user of his products is the latter industry rather than intermediate or immediate consumer. For example a sheet mill sells its tonnage direct to a maker of steel drums for use by the petroleum industry.

AFTER tabulation of data and grouping of end use code numbers, WPB's Requirements Section will allocate on the end use code basis the quantities of supplies which the board's industry branches will have to work with. There are three major problems involved in operating the end use code: (1) classification; (2) industrial structure and (3) WPB's organizational limitation. The problems of classification and industrial structure are broadly indicated by the foregoing discussion. The problem respecting WPB's set-up is whether it can get its plan in operation soon enough to accomplish its purpose.

With this mechanism applied, however, it is expected to greatly lessen complaints of non-adherence to priority regulations, and generally to tighten up both the priority and allocation program. This is what the Production Requirements Plan was designed to do. The priority system has been smoothed out somewhat but there are still reports of its frequent violation. Only now WPB is tabulating statistics gathered through its Production Requirements Branch affecting all industries. Use of these statistics will be made by tying pertinent figures from them in the current study on metal requirements and therefore give support for a sounder structure of the priority and allocation systems.

The extensive metal requirements study by groups covers iron and steel; ferroalloys; nonferrous metals; and oxides and other compounds of nonferrous metals. By far the largest listings obviously are those in the iron and steel industry. There are 173 iron and steel items covered and they of course by no means involve a detailed breakdown, but run from a group beginning with pig iron to finished lines, including carbon, alloy and stainless steel. There are 15 ferroalloys, 95 nonferrous items and 25 items in the group on oxides and other compounds of non-ferrous metals.

Want Rated Capacity Plus?



SUNOCO EMULSIFYING CUTTING OIL

*permits faster speeds..greater feeds..higher P-Q**

For the greatest production job in history, American machine tools must produce—not at rated capacity—but at rated capacity-plus . . . from rough cut to finish grind!

Take a tip from the leading machine tool builders who choose, use and recommend SUNOCO EMULSIFYING CUTTING OIL to keep their machine tools operating at rated capacity-plus. Flood your tools and work with SUNOCO!

SUNOCO's high lubricating and heat absorbing qualities protect tools from seizing, burning and chipping . . . SUNOCO makes possible increased speeds and feeds . . . longer tool life . . . less "down time" . . . finer finish . . . fewer rejects . . . higher P-Q (Production Quota).

Don't delay. Call in a SUN "Doctor of Industry"—a metal working expert—today. Get his recommendations on the proper cutting lubricants to help make your machine tools operate at rated capacity-plus . . . to help you set and maintain a higher P-Q.* Write

SUN OIL COMPANY • PHILADELPHIA

**Production Quota*

LET'S GO! U.S.A. KEEP 'EM FLYING!

RFORMANCE DATA
ERATION—Turn O. D. d face sides of gears—
A.E. 4615.
ACHINE—Sundstrand tomatic Lathe.
TTING LUBRICANT—art Sunoca to 20 parts ter.
Courtesy of dstrand Machine Tool Co.

SUNOCO

UN PETROLEUM PRODUCTS HELPING INDUSTRY HELP AMERICA

Harry O. King Heads WPB Copper Branch

Washington

• • • **Harry O. King,** New York, has been appointed as chief of WPB's Copper Branch. Mr. King replaces H. W. Dodge who has been acting as chief for the past month. Mr. Dodge will resume his regular position as a special assistant to A. I. Henderson, deputy director of the division. Mr. King is an officer of a number of corporations and is president of the Munson Lines, Inc. He was division administrator of NRA and was director of the copper code authority.

Ronald Allwork, New York, has been appointed as chief of a newly created planning and projects section within WPB's plumbing and heating branch. The new section will analyze statistical data affecting the requirements and capacity of the plumbing and heating industry, and maintain close contact on current technical developments with other branch sections and with the industry.

George E. Hoffman, Chicago, has been appointed as special consultant to the plumbing and heating branch. Mr. Hoffman, a sales division executive of Crane Co. in Chicago, was previously a member of the plumbing and heating industry advisory committee.

Nelson Gets Action on Kaiser Blast Furnace

Washington

• • • **Dissatisfied with** lagging negotiations for expansion of capacity, WPB Chairman Donald M. Nelson is reported to have interjected himself in the situation with the result that DPC has approved a plan for the construction of a 1200-ton blast furnace in California to be operated by Henry J. Kaiser. The exact location where the furnace will be built has not been revealed. It will obtain ore from Eagle Mountain in California and coal for the battery of ovens that will be built at the furnace will be obtained from Utah.

Heads Newark Contract Branch

Newark, N. J.

• • • **L. C. Ward, Jr.,** has been appointed manager of the contract distribution branch of WPB here.

Nelson Issues Order On Dollar-A-Year Men

Washington

• • • **Applying a policy** he recently outlined before the Truman Committee, WPB Chairman Donald M. Nelson has signed General Administrative Orders Nos. 4 and 5, setting up new procedures to be followed in appointments on a dollar-a-year basis and for "without compensation" services.

To comply with these procedures each dollar-a-year man must be: An American citizen of high integrity, outstanding experience and ability, qualified for a responsible administrative, technical, consulting or advisory position and in receipt of an earned income from his current non-governmental employment at a rate of at least $5,600 a year.

He can be appointed only to a position requiring special business or technical knowledge and experience and cannot make determinations directly affecting the affairs of the firm or company in which he is employed. No permanent appointment shall be made except after a thorough investigation of the proposed appointee by one of the investigatory agencies of the government.

Sidney J. Weinberg, Mr. Nelson's assistant, has been authorized to administer the procedure and all division heads have been instructed to examine the lists of all dollar-a-year men in their divisions and to terminate the appointment of all who do not qualify. Each division head was asked to report within 30 days, giving the names of such employees as can continue on a dollar-a-year basis, the names of all dollar-a-year men who have been transferred to a salary basis, and the names of all whose services have been terminated.

The procedure relating to appointment of persons on a "without compensation" basis stipulates that such appointees may serve in an advisory capacity as Government consultants working in the public interest and not as representatives of a private employer or industry. Any person serving on such a basis may not be permitted to assume any administrative responsibility or to exercise any authority over, or direction of the work of, executives or employees of the WPB.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

SHE'S KNITTIN' A SWEATER FOR TH' SOLDIER BOYS WHILE HER MACHINE'S RUNNIN'-- I DIDN'T THINK THERE'D BE ANY OBJECTION TO THAT
OH, NO! I DON'T THINK WE SHOULD OBJECT TO GOVERN-MENT JOBS !
THAT SOUNDS FUNNY--WE USED TO SNEAK AROUND MAKIN' BUTCHER KNIVES AN' STUFF TO USE AT HOME--WE CALLED THEM GOVERMENT JOBS!
WELL, THEY COULD CUT THRU JUNGLES WITH A BUTCHER KNIFE, BUT A SWEATER SENT TO SINGAPORE IN SUMMER... WELL, TOO MANY SWEATERS IN THIS WAR! MORE BREECH CLOUTS IS WHUT OUR ARMY NEEDS!
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF. COPR. 1942 BY NEA SERVICE, INC.
RUSSIAN THE SEASON
2-27

"PUT IT ON THE BLANCHARD"

For speed, accuracy, and low cost on your larger surfaces you should investigate the Blanchard No. 27.

This Blanchard No. 27 Surface Grinder, with 42″ segment wheel and 84″ swing, grinds steel and semi-steel die shoes from the rough. The work varies in size but each chuck load, whether one large piece or several small pieces, presents a large area from which 1/8″ to 1/4″ stock must be removed. Because of the competitive nature of the product (standardized die sets) every effort must be made to keep costs low. Loading time is shortened by using a lifting magnet, and the grinding is done at the fastest possible rate. The machine is kept continuously busy and, in addition to die shoes, it machines many large steel plates.

The BLANCHARD
MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS.

Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

BLANCHARD

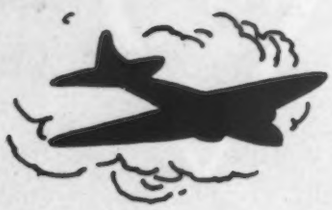
CHECK THESE ADVANTAGES OF BLANCHARD GRINDING

- ★ **Production**
- ★ **Adaptability**
- **Fixture Saving**
- ★ **Operation Saving**
- ★ **Material Saving**
- **Fine Finish**
- ★ **Flatness**
- **Close Limits**

★ *. . . . . Especially valuable on jobs like the one illustrated.*

WEST COAST . . .

• California plants invite mass fifth column attack . . . Aircraft production still on part time basis because of parts shortage . . . Worker morale boosted by company sponsored news broadcast.



SAN FRANCISCO — It's about time now for someone to write an article entitled "California Is Ready!" Similar to articles appearing a few weeks ago entitled "Hawaii Is Ready!" and, more recently, "Singapore Is Ready!"

The lesson of Pearl Harbor seems to have been pretty well learned by this time. Vital military centers and manufacturing plants bristle with anti-aircraft guns mounted on roofs and in nearby vacant lots, and nothing short of a direct hit could destroy planes protected by three-sided concrete or earth embankments that dot all airfields.

Even the wiliest Jap or Quisling would have a hard time evading efficient plant protection staffs which man factory entrances or meet visitors at barricades constructed across the street.

By any technique the enemy has used so far, he would have a hard time carrying out a damaging military attack. He would find it far more difficult to put sugar in the fuel or sand in the gears of the industrial machine. Every worker who has eyes, including would-be traitors, can see these precautions. Non-citizen Japs and other aliens must clear out of vital areas—according to the rules. We are prepared for the obvious, and are in fine shape if the fox sticks his nose out of the front door to his burrow instead of leaving by any one of the back doors and circling up behind us.

In the lesson entitled "total war" it has been drummed in thoroughly that the entire civil population is likely to be on the receiving end of enemy attacks. Individual Fifth Column activity is well guarded against. In this country, at least, the potentiality of concerted enemy action originating in any of our large population centers is not so well realized. Certainly, the rules restrict the residence and circulation of aliens, but no band of attackers-from-within is going to paint a rising sun or swastika on its vehicles or try to drive past the guards in broad daylight.

The place for factory barricades is not across the street or a block away, but a mile away. Probability of the enemy gaining access to parked coveys of planes is not great, but even the slightest chance is too great a one to take.

Authorization for the Army to remove all persons, citizen or alien, from strategic areas gives the necessary power to sterilize vital manufacturing districts if the emphasis is placed on "all persons" rather than just the suspect few aliens.

INCREASED production of small parts, rather than materials, would in most cases help tremendously in increasing aircraft production in Pacific Coast plants. Although nearly every plant can truthfully say it is operating 24 hr. a day, swing shifts, even in the cases of the biggest producers, exist little more than in name. One big manufacturer frankly operates on only two shifts. In some plants, the graveyard shift could be manned by many more workmen. Although it is difficult to determine to what extent operations could be expanded before running into material shortages, the immediate barrier to complete utilization of production facilities is the failure of suppliers of small parts to produce in adequate quantities.

This condition is nothing new. It was painfully apparent a year ago. Failure of government production agencies, whatever their alphabetical alias, to remedy these shortages and to coordinate production of aircraft components to keep pace with assembly operations remains the industry's heaviest black mark against Washington.

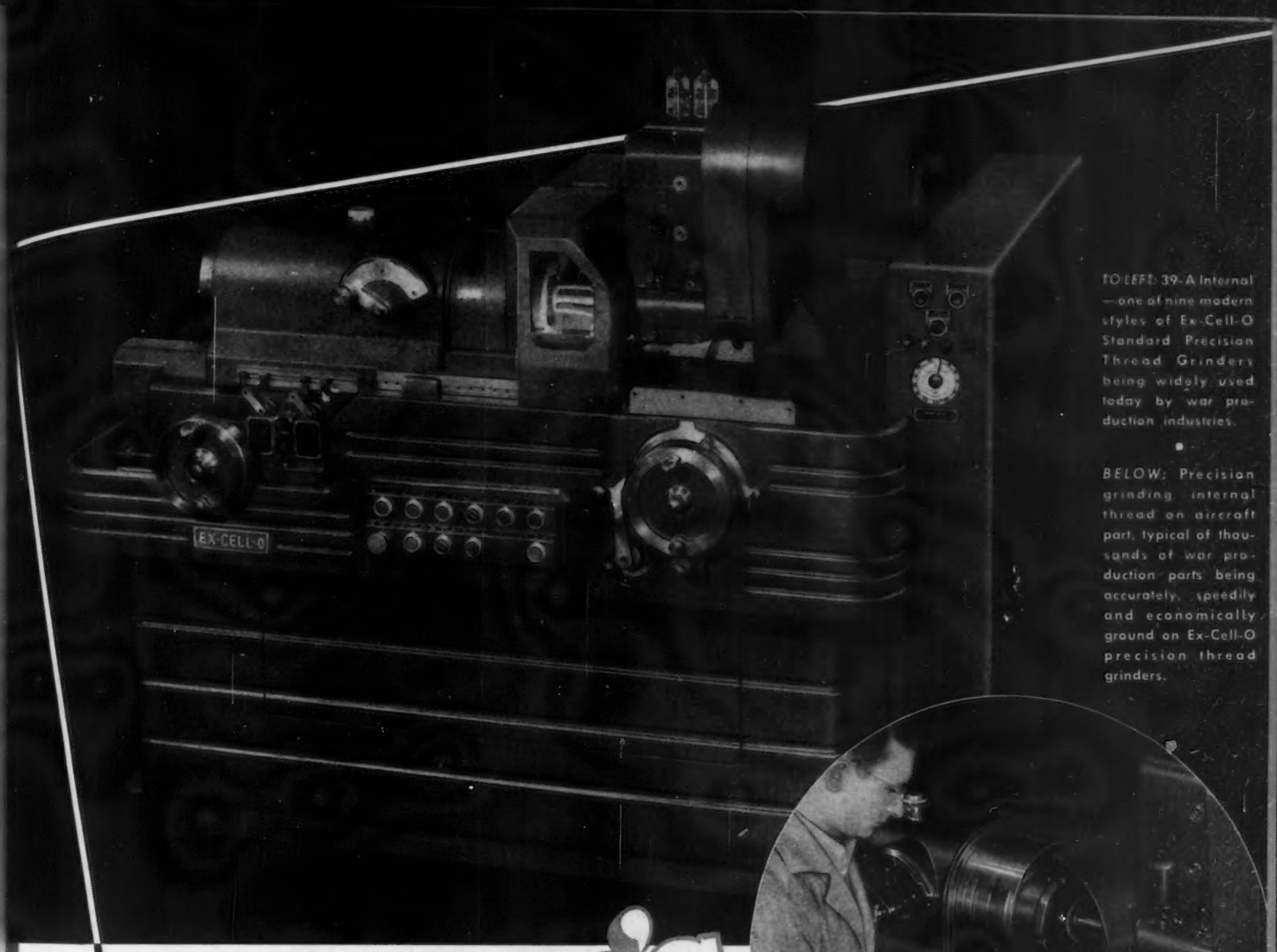
The paucity of certain small parts supplied by sub-contractors results, according to hearsay, from shortages of critical materials. Sufficient materials are apparently available for the later stages of production in most instances.

Despite all that has been written concerning the necessity of splicing new contracts onto the tail of those nearing completion, thereby avoiding shutdowns or reduced operations during the period of changeover, one air craft plant last week was working reduced shifts five days a week because of uncertainty as to what was to follow its current contract.

Addition of 1500 women to the payroll at Lockheed is expected when production is stepped up. Ultimately, the Vega division expects to employ 2000 women. This solution of the personnel problem will release trained men for other important assembly and fabrication operations.

Aircraft workers probably more than any other civilian group have a direct interest in war news because of their part in furnishing the wings of destruction. Shortly after Pearl Harbor, when Consolidated Aircraft Corp., San Diego, discovered that workers were bringing small radios to work so they could listen to news programs during their lunch hour, the company snatched a glorious morale building opportunity. Sponsorship was arranged for news programs coinciding with the lunch hour on each shift. Instead of the usual commercial sales announcement, the workers were sold on the part they could play by building more planes for the armed forces of democracy. Soon appreciative comments began to come in, not only from Consolidated workers, but from employees of aircraft plants in other parts of southern California. As a result, Lockheed now sponsors a similar program for Los Angeles, and the Consolidated program is broadcast over a smaller station which reaches only the San Diego area.

COLUMBIA Steel's blast furnace at Provo, Utah, the only pig iron producer west of the Rocky Mountains, is again in operation after a relining job which Columbia claims is a world's record. The job is further notable



TO LEFT: 39-A Internal—one of nine modern styles of Ex-Cell-O Standard Precision Thread Grinders being widely used today by war production industries.

BELOW: Precision grinding internal thread on aircraft part, typical of thousands of war production parts being accurately, speedily and economically ground on Ex-Cell-O precision thread grinders.

TODAY'S PRODUCTION CALLS FOR EX-CELL-O PRECISION

Ex-Cell-O's wide experience in designing and building precision machine tools makes Ex-Cell-O engineers exceptionally familiar with production requirements in today's emergency. Take, for instance, precision thread grinding, almost indispensable in the aircraft and other war industries where hardened threaded parts must be finished to the highest degree of accuracy. Ex-Cell-O engineers have designed nine standard thread grinders—automatics, universals, plain production machines. This variety in style and the flexibility in use of these Ex-Cell-O machines enable a manufacturer to select a standard machine that will meet specifically his exact thread grinding requirements today and provide him with equipment that can be readily and profitably adapted to production of civilian needs tomorrow. Because of their soundness in design, their thoroughness in construction, their simplicity and efficiency of operation, and their modern styling, Ex-Cell-O standard thread grinders are proving the first choice of America's war production industries.

EX-CELL-O CORPORATION • DETROIT

XLO

EX-CELL-O *means* PRECISION

THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT • R. R. PINS AND BUSHINGS • PRECISION PARTS

because it was tackled from a standing start, in mid-winter, and in a locality remote from large steel operations.

On Jan. 16, because of a "breakout" through the hearth jacket, it was necessary to blow out the furnace to reline. With the urgent need for all-out defense production, C. T. Keigley, general superintendent, realized that the furnace should be relined in minimum time due to the necessity of replacing part of the hearth jacket before bricklaying could be started. On Jan. 19, the furnace crew pitched in to remove the old brick lining. On Jan. 29 the new lining was started and on completion of brick work in the hearth, heat was immediately applied to dry out the bottom of the furnace as the bricklayers continued laying brick to the top. The relining was completed on Feb. 11. Scaffolds were removed immediately and a drying fire started in the furnace. After five days of drying, the furnace was blown in Feb. 17, with just 31 days elapsing between blowing out and blowing in.

In 1937 the Ironton furnace was last relined in an overall time of 64 days. Inasmuch as the furnace has been operating during the past six months on an average production of 660 tons a day, the record relining job means that 33 days' output of pig iron amounting to some 21,780 tons will be made available because of the speedy work.

Leveling of inventories is indicated by the current report of the Purchasing Agents Association of Northern California. Compared with a year ago, 70 per cent of members participating in the association's survey reported gains in inventories over a year ago, compared with 61 per cent and 69 per cent in the last two monthly reports. Lower inventories were reported by 19 per cent, compared with 24 per cent and 21 per cent in the two previous reports.

Buying policy of many of the members is, of course, restricted by shortages and priorities, but the survey shows further contraction in the number buying four months or longer in advance. On the other hand, fewer firms report hand-to-mouth purchasing, and purchasing one and two months ahead. Nearly one-half the members report they are purchasing on a three months' basis. The "practicable working minimum" priorities provisions are evidently exerting considerable influence.

PRODUCER FOR VICTORY: The face of this Frenchman, showing his grief over the downfall of France and Nazi occupation of Paris, has become widely known in most free countries. Weirton Steel Co. recently placed posters carrying the photograph throughout its plant. The poster says: "Yesterday I was a free French worker. Today, I am the slave of the invader. Believe, mon Américain, nothing is important but to keep your freedom—to produce, to build tanks, planes, guns. Destroy the enemy who would take your freedom. For your sake, for God's sake—PRODUCE FOR VICTORY."

Allis-Chalmers Wage Dispute To Be Arbitrated

• • • **The National** War Labor Board announced Feb. 18 that the wage dispute between Allis-Chalmers Mfg. Co., and the United Electrical, Radio and Machine Workers of America, CIO, had been settled by an agreement to submit the entire controversy to arbitration.

The agreement was reached following two days of hearings before F. W. H. Adams. The agreement provides that both parties will submit the entire controversy to Mr. Adams who will act as the arbitrator and who will first define the issues to arbitrated. It was agreed also that Mr. Adams will not hold any further hearings, though he may call for further information from the parties.

WPB Forms Automotive Parts Advisory Committee

Washington

• • • **The formation of** an Automotive Parts Industry Advisory Sub-committee has been announced by WPB's Bureau of Industry Advisory Committees. The Government presiding officer is R. L. Vaniman, Deputy Chief of the Automotive Branch. Members are as follows:

C. E. Hamilton, president, Automotive Gear Works, Inc., Richmond, Ind.; C. C. Carlton, vice-president, Motor Wheel Corp., Lansing, Mich.; C. S. Davis, president, Borg-Warner Corp., Chicago; Burke Patterson, assistant to president, Thompson Products Co., Cleveland; J. D. Eby, vice-president, Wagner Electric Corp., St. Louis; R. F. Koch, service manager, International Harvester Co., Chicago.

M. D. Douglas, manager, Parts & Accessories Division, Chevrolet Motor Co., Detroit; F. C. Bahr, vice-president and general manager, Motor Parts Corp., Chrysler Corp., Detroit; V. E. Doonan, general sales executive, Ford Motor Co., Dearborn, Mich.; B. F. Morris, executive vice-president, Thomas A. Edison, Inc., West Orange, N. J.; and Max Miller, service merchandising manager, Yellow Truck & Coach Co., Pontiac, Mich.

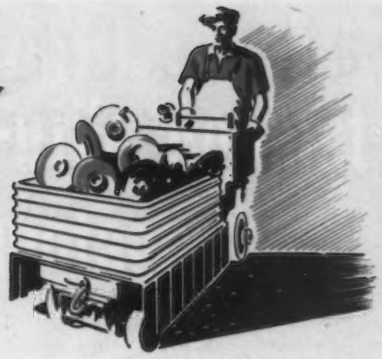
Pool of 33 Firms Has Much Idle Capacity

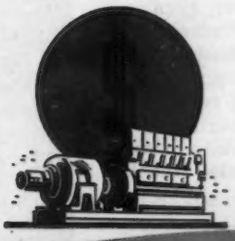
Chicago

• • • **A pool of** 33 local manufacturers with facilities for the design and production of dies, tools and fixtures estimates that it has about 50 per cent of its capacity now idle. Known as Metal Fabricators Institute of Chicago, the pool has a total of 800,000 sq. ft. of production floor space.

TRUSCONVEY

YOUR PLANT MATERIALS TO HELP LICK THESE BIG PROBLEMS!..





SHORTAGE OF MAN-POWER

HIGH MANUFACTURING COSTS

SHORTAGE OF TIME

TRUSCON STEEL BOXES and STEEL SKIDS will help meet the many and increasingly difficult problems that wartime production is bringing about in your plant.

TRUSCON STEEL BOXES and STEEL SKIDS will help you lick the shortage of man power, by enabling fewer men to deliver more material to assembly lines and production points, thereby keeping skilled operators plentifully supplied with parts and materials for full-time output.

TRUSCON STEEL BOXES and STEEL SKIDS will help you lick high manufacturing costs, by minimizing labor increases and production lags. This is an especially important point where prices are "pegged" and you must watch every cent of cost.

TRUSCON STEEL BOXES and STEEL SKIDS will help you lick the shortage of time. America needs to be speeded up in every way possible, to get the wartime production so essential for victory. Truscon Materials Handling Equipment will help you get faster action, less waste motion, and more efficient work in each and every one of your manufacturing steps.

Let us study your handling operations and requirements and we will make well-planned recommendations exactly suited to your needs.

Learn to say TRUSCONVEY—learn the many benefits you will receive from Truscon Steel Boxes and Steel Skids—write us for illustrated literature today, and ask for a plant survey without obligation.

Investigate TRUSCON Foundry Flasks

Light weight...durability ...strength where strength is needed...easily rammed and shaken out . . . these are features of economy and production you get in TRUSCON foundry flasks. Write for descriptive literature on complete line.

Truscon

MATERIALS HANDLING EQUIPMENT

Truscon Steel Company, Pressed Steel Division, 6100 Truscon Avenue, Cleveland, Ohio

Subsidiary of Republic Steel Corporation

YOU'LL FIND IT WILL PAY TO TRUSCONVEY YOUR PLANT MATERIALS

Fatigue Cracks BY A H.

All Is Not Serge That Glitters

. . . In re the Feb. 12 editorial, "The Cook and the Glamor Girl," let J. H. Van D. consult the Superfinish boys and be reminded that truth and accuracy produce relative dullness, while a brilliant polish is used to hide defects.

—*Deac*

The infant feud, fathered by *Fortune* and mothered by our president and editor, John Herbert Van Deventer, is thriving lustily. As you know, it was started by *Fortune's* crack that the American Locomotive Co. has left "the stodgy trade paper advertising rut and is keyed to the level of the general periodical."

The American Locomotive Co. has never been an advertiser of ours, but being, as we freely admit, the world's No. 1 trade paper, we wince vicariously whenever the toes of any of our brethren are stepped upon. So J. H. Van D., countered with the Feb. 12 two-pager, "The Cook and the Glamor Girl," which, judging from the play it is getting at this writing, is already having a pedestal dusted off for itself in the editorial Hall of Fame.

Strictly From Hunger

• • • There is more to the feud than meets the eye. Owing to the falling off in the advertising of radios, automobiles, washing machines and many other things bought by the general public, the general magazines are on reduced rations, and are looking longingly and larcenously at the advertising of manufacturers who sell to specialized fields.

If you turn out something that is used, for example, only by makers of rubber goods, the quick road to wealth is to make a good product and then practically live with rubber goods manufacturers twenty-four hours a day. But after acquiring your fortune you might bemoan the fact that your fame was confined to the rubber goods industry. You might yearn to have the eyes of the butcher, the baker, and the candlestick maker light up at the mention of your name. It is as if the proprietor of the highly successful Ayres Department Store in Indianapolis mourned, "They know us around here all right, but what does our name mean in Seattle, Santa Barbara, or Sioux City?" And then proceeded to play the red network across the boards.

Not that we are unsympathetic toward the yen to be known to all and sundry. We don't wonder that manufacturers who sell to specialized fields frequently find their breath coming in short pants while listening to the tempting songs of the general magazine Loreleis. For we ourselves glow like a neon bock beer sign whenever we are quoted in the big publications reaching the general public. Then the glow subsides and we ask ourselves how much good it does to be known outside the field we serve, and end up by deciding it doesn't do us very much good, observing that there are many concerns making pots of money by entrenching themselves as solidly as possible in the fields they serve and not caring particularly whether people outside those fields know them from Adam.

It seems to us that the lovesongs of the general magazines to manufacturers who sell to limited markets are usually strictly from hunger. But then, of course, we're biased.

Lovesick Linotyper

• • • An anonym among this page's loyal army of eighteen readers sends us a newspaper clipping headed, "ARMS PLANTS TO CALL A MILLION WOMEN," and containing this statement, "*Mr. Hillman's office has estimated that war industries will have to take on some 10,000,000 more korkers this year . . . if war production goals are to be met.*"

Mistakes don't just happen. They are caused. Obviously in this case the linotype operator is in love with a pretty munitions plant worker. When he came to the word "worker" in the manuscript, his subconscious got to work and it came out "korker."

Our anonym adds sourly that pulchritude and production do not mix, but we doubt that there is much to worry about, as even Colbert would find it hard to look captivating in coveralls.

Wrong Sex

• • • Speaking of pulchritude, last week we printed here a letter from Ilah B. Moon, general manager of the Moon Welding & Machine Co., Kokomo, Ind., whose admiration for your favorite family journal almost equals ours. We thought Ilah was a man's name, but as you will see from this letter and the photograph, we were wrong:

I wish to thank you for running my letter in The Iron Age, but I cannot qualify for the title of Mister, for you see I happen to be a girl.

Mythical Pinch-Hitter

• • • We learn from a not particularly reliable source that the head of a prominent firm in the industry received an invitation to speak at a certain convention. He wired in reply, "RETEL WOULD LIKE TO ADDRESS YOUR MEETING BUT I MUST ATTEND CONFERENCE HERE." An hour later this reply came back, "SORRY YOU CAN'T BE WITH US. PUTTING RETEL ON PROGRAM. WIRE INITIALS AND COMPANY CONNECTION."

Stopper

• • • Can you stretch a work-week to 8 days?—*Parker-Kalon Corp.*

Tongue-Caresser

• • • Among the words that euphophiles regard as especially pleasing to the tongue and ear are *golden, hernia,* and *cellar door.* To the collection we would like to contribute the name of one of our Moscow subscribers. It is *Sharikopodshipnikovskaja.* What it means we have no idea, but the smooth flow of the nine syllables makes us think of a stream of maple syrup descending upon a stack of wheats.

Aptronym

• • • **A letter came in the other day from the American Steel Works, Kansas City, Mo., signed by O. Longerbeam.**

Puzzles

• • • The Joan in last week's cerebrum searer is eight years old, but to explain why requires two pages and a generous attitude on your part.

If you can clothe this skeleton with figures within 35 minutes your gray matter is in the groove:

***) ****** (**** . ****

***

———

***

***

———

***

***

———

***

***

———

****

****

———

As you will see, there is a decimal point in the center of the eight-digit answer.

Guards Are Futile Against
THIS Sabotage !
RIGHT under your guards' noses, unsuspected saboteurs may be steadily draining off vitally needed power... handicapping production as much as would destroying one generator out of every four or five!
These unsuspected saboteurs *are* at work in your plant if your pumps are not of the latest, improved designs. For ten-year-old pumps of certain types, even if as good as new, require 25% more power than today's Fairbanks-Morse models. And 4- or 5-year-old pumps of other types consume so much more power than current models that continued use is more costly than replacement.
Find out *now* if *your* pumps are the types which curtail production and steal power and profits. Let a Fairbanks-Morse Pump Engineer make an inspection, with no cost or obligation to you. Write Fairbanks, Morse & Co., Dept. B38, 600 S. Michigan Ave., Chicago. Branches and service stations throughout the United States and Canada.
FAIRBANKS-MORSE CENTRIFUGAL PUMPS
A complete "family" of single-stage, split-case pumps for low, moderate, medium, and high heads, is described in Bulletin 5810D. Many other bulletins available on other types.
FAIRBANKS·MORSE PUMPS
DIESEL ENGINES ELECTRICAL MACHINERY MAGNETOS RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
PUMPS MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

Dear Editor:

STODGINESS VS. GLAMOR

Sir:

Perhaps you are "stodgy," but I prefer your stodginess to *Life's* and other popular periodicals' carelessness with facts. I always look over your news sections with much interest, expecting to find reliable information on very important subjects and a point of view that is too much absent in some other quarters, if the ultimate welfare of the country is worth considering.

I may add that I am one of those "fool" professors who does not hesitate to transfer some of this information and this point of view to my classes, as my students can assure you.

This iron ore region has suffered much from the purveying of erroneous information by popularizers. Hence, this society is building up the largest possible library of documents bearing on this region's history and present position. Even college texts on economic history are pretty careless of facts where one might well expect to find scientific accuracy.

L. A. CHASE
Department of Social Sciences
Northern Michigan College of Education

LETHARGIC INDUSTRY

Sir:

Personal observations made in the last week lead me to believe that American industry is still coasting along in its happy go lucky style. Lately I have contacted a goodly number of production engineers and as a rule their tales of woe all come out of the same kettle. All their gripes had to do with curtailment of material in their normal lines . . . sure, they were turning out defense material, but it was secondary to their domestic lines.

When questioned if their defense contracts were not of sufficient size to take up the slack in their plants, they agreed they were, but rather reluctantly. Replies something like, "Oh, we will get over to defense production, but we want to take care of our customers first—after we supply them we will turn 100 per cent to defense orders." Boy, oh boy, I only hope Japan and Adolf will wait until we get all of our domestic wants satisfied —then we will show both of them how to produce war material.

Now if the "intelligentsia" of our factories are showing such an attitude, how will the worker react? What an example to set for the production worker—this is sabotage of the worst kind, yet all of these gentlemen are patriotic, loyal Americans. Anyone of them would rather die fighting than give up our liberty. Yet they coast along on our defense needs as if the war was a long distance away.

What the country needs are some lessons to drive home the fact that defense production is of paramount importance. It may be that my observations are merely local and that this lethargy does not exist in industry as a whole. Acknowledging the possibility, I still maintain that American industry needs a full shot of stimulus.

J. H. GREENLAND
American Steel & Wire Co.,
Cleveland, Ohio

PLASTER MOLDS

Sir:

I have seen your article, "Plaster Molds," by W. A. Phair in your issue of Oct. 9, 1941, and would be grateful if you could send up to 12 reprints of it.

B. FULLMAN
Metals Research Assn.,
London

• The demand for copies of this article, describing a new method of producing non-ferrous castings, exhausted our supply. But the Casting Patent Corp., 11 South La Salle St., Chicago, which had reprints made, may still be able to supply copies.—Ed.

SPRINGS NO MINOR THINGS

Sir:

Your "Industrial Advertising Tomorrow" address was very interesting. However, I am sure that anyone connected with the spring industry would find the following very irritating:

"Take such minor things as nails, washers, or springs. The maker turns them out, of necessity, by the tens of thousands and throws them into barrels. What they will go into when they come out of the barrels, whether it shall be baby carriages or battleships, he has not the slightest idea."

First, I don't think springs are "minor things." Some sizes of carefully calibrated hot wound springs may cost over $100 each, and some types of governor springs several dollars each *even when produced in quantities!* And in mechanical installations springs serve either to absorb shock or to actuate mechanisms, thus lifting them from the nail and nut classification.

Second, no mechanical spring manufacturer *"throws* his product into barrels." To do so might distort the spring and change carefully held physical dimensions.

These first two things, however, become insignificant when the last part of your statement is considered, "What they will go into when they come out of the barrels, whether it shall be baby carriages or battleships, he has not the slightest idea." It is the first duty of any reliable spring company to find out where a spring will be used, for atmospheric conditions, temperatures and frequency of operation are some of the most important factors to be considered in the designing of a spring. They have a direct bearing on the type of material to be used and the kind of finish to be applied. Some of us are spending further thousands in maintaining laboratories and competent engineering staffs to insure the best possible spring for any particular application.

CHAS. W. STEWART
Muehlhausen Spring Corp.
Logansport, Indiana

• Belittling the importance of springs was farthest from our minds. Rather our intention was to call attention to their importance as an element which, like bolts, nuts and rivets, is sometimes overlooked by the "higher thinkers."—Ed.

OPA PRICES

Sir:

We have at hand your February 12 issue containing the special OPA price section, and are again reminded of the excellent service that you have given us on keeping our organization posted as to priorities, allocations and price maximums.

Our purchasing department has found it almost indispensable to have the separate sections that you have published on priorities and allocations to keep at hand for ready reference. Each of these that you have sent out is the best and most concise summary of this situation we receive from any source.

A. W. ROSE
Warner Gear Division
Borg-Warner Corp.
Muncie, Indiana

SALVAGE

Sir:

Your editorial on "Salvage" in the Feb. 5 issue was 100 per cent true. Did Roosevelt and Nelson get a copy?

HANFORD ECKMAN
Piper Aircraft Corp.
Lock Haven, Pa.

• Yes.—Ed.

TOMORROW'S HEADLINE NEWS IS MADE IN *YOUR* PLANT TODAY!

REMEMBER PEARL HARBOR

SOME DEFENSE PRODUCTS BEING WHEELABRATED

Bombs
Shells
Rifle receivers
Gun barrels
Armor plate
Tank transmissions
Supercharger parts
Tank castings
Airplane engine parts
Propeller blades
Aluminum crankcases
Airplane landing gears
Tank treads
Cartridge clips
Tank bogie wheels
Trench mortars

IT'S "Men *and* Machines working together"—*when* a torpedo labeled "U.S.A." plows its way through a foot of steel armor-plate and an enemy ship goes down; *when* a bombing squadron blows a hostile air base "sky-high"; *when* a fleet of tanks crashes irresistibly through enemy lines.

As Donald Nelson said recently: "Modern war is a war of materials and of productive systems . . . Today's army cannot be any better than its equipment—plus the ability of the people back home to replace that equipment in adequate volume."

Many, if not most, of the implements of war require cleaning at some stage in their manufacture. And that operation is frequently the starting point for production tie-ups and shipping delays.

Investigate this in your shop—don't let it happen there. You can prevent it with airless WHEELABRATING, the speed-cleaning process that is saving precious time in over 1300 plants by reducing cleaning operations to a matter of minutes.

ADVANTAGES OF WHEELABRATING

1. High-speed cleaning.
2. Low cleaning costs.
3. Improves machinability and grinding.
4. Simplifies inspection.
5. Increases life of cutting tools.
6. Improves appearance.
7. Provides perfect bond for final finishes.
8. Handles practically unlimited variety of work.

TRADE MARK
THE AMERICAN MOLDER

AMERICAN FOUNDRY EQUIPMENT CO.

510 S. BYRKIT STREET, MISHAWAKA, IND.

This Industrial Week . . .

. . .

WAR requirements for steel are now estimated at more than 43 million tons for the current year—a figure showing the extraordinary effort U. S. industry is putting forth in the war against the Axis nations.

This great volume of steel will be earmarked for such direct war needs as the shipbuilding and railroad industries, shell steel and tank manufacturers and for lend-lease. Indirect war needs will take additional large tonnages but it is the big tonnage required for the foregoing five major groups that will brush aside much other demand for this metal.

Regardless of how successfully government control of steel distribution is applied through the priority system, it appears likely that certain "indirect" war requirements must suffer along with some "essential" civilian requirements to provide the steel needed for the maximum war effort. Already many steel mills are scheduled months ahead on steel orders carrying ratings of A-1-j or better with some units unable to promise delivery on anything less than A-1-a for weeks to come.

Although a large segment of steel order volume is concentrated within the A-A and A-3 priority ratings, a much greater tonnage is expected to be put into the top classifications within the next few months.

Railroads Must Prove Needs

One industry which has already suffered from the pressure for steel from the Big Five group of war steel consumers is the railroads, promised more than 500,000 tons of steel rails in the first quarter of this year, provided that production does not interfere with shell steel. Now, however, it is said that this allocation may be cut in half unless the railroads can substantiate with specific details and a strong case the need for such a large allocation. It is also believed that the concentration of direct war orders will be such that the 45,000 freight cars which were scheduled to have been completed by May 1 may not be finished before the end of June. Bottlenecks for structural steel for freight cars are appearing, hence this type of steel may soon be placed on a complete allocation basis. Evidence that shipbuilding and shell requirements are drawing off semi-finished steel before it trickles down to other products is found in the falling off in the shipments to warehouses. In January some warehouses received 50 per cent less than the quota allowed them.

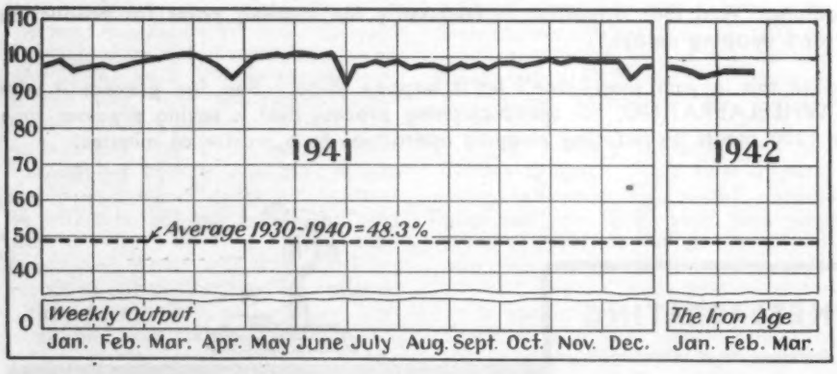
With such great pressure for steel, no step can be avoided which will add to supplies. Automobile and automobile body manufacturers have been advised by telegram by the War Production Board director of industry operations not to make shipments from their steel stocks except on orders bearing high preference ratings. Alloy steel remaining in inventories of the automobile companies as a result of the cessation of automobile production may be sold only on orders bearing a preference rating of A-1-k or higher. All other steel and steel products may be sold only on orders with a rating of A-3 or higher. Shipments may be made on orders bearing the required ratings without special authorization from WPB, but a duplicate copy of each order or letter signed by the customer and certifying material and quantity ordered and the preference rating applicable must be forwarded to the distressed stock unit, Iron and Steel Branch, War Production Board, Washington, D. C.

Tighter Control Put Over Casing

In a similar order, accompanying a general tightening up of the entire priority system as applied to metals, steel manufacturers supplying the petroleum industry have been ordered by the WPB not to ship oil country casing, tubing or drill pipe on or after March 14, or to ship line pipe on or after March 7 except on orders bearing a rating of A-9 or higher. The purpose of the order is to prevent shipments of steel on unrated orders,

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts-burgh	Chi-cago	Youngs-town	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	South-ern	De-troit	South Ohio	West	St. Louis	East	Na-tional
This Week.....	97.0	101.0	96.0	91.0	94.0	90.0	91.0	99.0	94.0	99.0	95.0	81.0	103.0	95.5
Last Week.....	97.0	104.0	95.0	91.0	96.0	90.0	88.0	99.0	101.0	98.0	95.0	81.0	113.0	95.5

and insure that the limitations applying to the petroleum industry are observed.

Warehouses which purchase this type of goods are entitled to use a preference rating of A-9 under supplementary order M-21-b.

Excess aluminum stocks in the hands of manufacturers, it is announced, will be bought by the Government at prices fixed by the inventory and requisitioning section of WPB. One of a series of similar moves, this action is expected to recover as much as 20,000,000 lb. of the metal which will be allocated to war plants after its purchase by the Metals Reserve Co., RFC subsidiary.

This week the WPB stopped an auction sale of boring mills, grinders, milling machines and other machinery belonging to a Springfield, Ohio, company. The order was issued to permit a survey of the plant to determine whether it can be used intact for war production. WPB is expected to allocate the machinery if it is not feasible to obtain a new management and utilize the plant and facilities.

Steel production in the Washington holiday week continues at the record level of a week ago with the rate at 95.5 per cent of capacity. Some loss of production still is reported because of the inferior quality of scrap received by the mills.

Can High Rates Be Maintained?

The Pittsburgh rate is unchanged this week at 97 per cent, while Chicago declined to 101 per cent. Youngstown rose a point to 96 per cent, while Cleveland dropped to 94 per cent from last week's revised rate of 96 per cent. Philadelphia remained unchanged at 91 per cent and Buffalo at 90 per cent. Wheeling is down three points to 91 per cent while Birmingham is unchanged at 99 per cent. Detroit dropped seven points to 94 per cent and Southern Ohio River is up a point to 99 per cent.

Whether these high rates of ingot production can be maintained indefinitely without losses due to strikes is a question that is bound to recur to industrial observers despite President Roosevelt's emphasized warning in his Feb. 23 address to the nation that no "interruptions" must stop the flow of industrial production. Again the National War Labor Board is face to face with the demand of the SWOC for a steel wage increase and for the closed shop and dues checkoff. Should the War Labor Board grant the demand for the closed shop it would set a precedent to cover not only the steel industry but U. S. industry generally. For the time being, interest in what the board's decision will be on the closed shop is great enough to overshadow the important question of higher wages and their effect on inflation.

That the War Labor Board is jittery—understandably—over the closed shop was evident last week in its decision to deny the union shop and a $1 a day pay raise to CIO employees of the Phelps Dodge Corp. The board indicated that it would like to see a closed shop policy fixed by some other source and William H. Davis, War Labor Board chairman, indicated that he would not object if the board's problems were "lightened by the formulation of a policy of some higher authority." (This could only be the President or Congress.)

The answers to the closed shop and wage controversies now placing an increasing pressure on the U. S. war production effort apparently were given in principle in President Roosevelt's Feb. 23 declaration of three high purposes for every American. They are, he said:

1—"We shall not stop work for a single day. If any dispute arises we shall keep on working while the dispute is solved by mediation, or conciliation or arbitration—until the war is won.

2—"We shall not demand special gains or special privileges or special advantages for any one group or occupation.

3—"We shall give up conveniences and modify the routine of our lives if our country asks us to do so. We will do it cheerfully, remembering that the common enemy seeks to destroy every home and every freedom in every part of the land."

While the production drive must necessarily be concentrated on existing plants, since the U. S. is faced with a definite shortage of time, important new plants still are being considered. Plans are being studied, for example, for a large new bomber plant in Ohio, the plant to have some 2,000,000 sq. ft. of floor space and employ more than 20,000 persons. A toluene plant producing as much as the entire U. S. output in the first World War is to be built in Indiana. It will be completed well within the period in which the nation still "has time" to defend itself. How sharply war implements production in this country has been stepped up is shown in the President's report that the gigantic plane-ship-tank production program announced after the Pearl Harbor attack is up to schedule.

Truck Body Order Increased

In what is certainly one of the largest sub-contracting jobs of the war, the original order of 340,000 truck bodies for the Army to be built by the Edward G. Budd Mfg. Co. at its Eastern and Midwestern plants has been increased to 430,000. Four companies are building the trucks of which a very large share will be sent to fighting fronts of the United Nations throughout the world.

Structural steel awards last week are estimated at 25,810 tons, compared with 22,900 tons a week earlier, while pending projects are at 32,360 tons, against 18,100 tons. Reinforcing steel awards of 15,000 tons were less than half last week's total of 36,000 tons while new jobs dropped to 3515 tons from 10,000 tons last week.

Forms PD-298, PD-299, PD-1-A Now Available

• • • The Iron Age has prepared an emergency supply of the new reports steel plate consumers are required to file with the War Production Board—Forms PD-298 and PD-299. Copies are available at $1 a hundred.

If you need PD-1-A we can also supply you, at 5c. a set. A set consists of original, duplicate, and triplicate sheets, and instruction page.

To avoid small bookkeeping entries, will you kindly send stamps or coin with orders for less than $1 to The Iron Age Readers' Service, 100 East 42nd Street, New York.

"ALL THE FACTS ABOUT Stainless Steel THAT ARE *Certified* TO PRINT!"

You'll find them in Allegheny Ludlum *Blue Sheets*

There's more stainless being used these days than ever before; it's a vital alloy of wartime production. You may be fabricating one or more of the stainless grades for the first time. If so, you'll not want to waste valuable time learning their treatment, properties and handling.

Allegheny Ludlum offers you authoritative, certified Blue Sheets on all stainless steel grades. Each sheet contains clear, accurate data on analysis, and chemical and physical properties. Don't take the chance of wasting time or materials by guessing or rule-of-thumb figuring. Allegheny Ludlum Stainless Steel Blue Sheets are yours for the asking.

THERE'S A *Blue Sheet* FOR EACH STAINLESS GRADE

Blue Sheets are available without cost on the stainless grades listed below. Check those wanted.

( ) A. M. 12-Type 410
( ) A. M. 22 EZ-Type 416
( ) A. M. 12 NH-Type 405
( ) A. M. 12-2-Type 414
( ) A. M. 12-2-EZ-Type 414-F
( ) A. M. 16-1-Type 431
( ) A. M. 17-Type 430
( ) A. M. 18-8-(All Types)
( ) A. M. 21-Type 442
( ) A. M. 25-12-Type 309
( ) A. M. 28-Type 446
( ) A. M. 46-Type 501
( ) A. M. 46-Type 502
( ) Fabrication of Allegheny Stainless Steel
( ) Allegheny Metal Wire Products

NOTE. "A. M.", where used above, means "Allegheny Metal"

ALLEGHENY LUDLUM STEEL CORPORATION S-207
Oliver Building, Pittsburgh, Pa.

Send me Blue Sheets (certified data) on the stainless grades checked above:

Name_____

Company_____

Address_____

ALLEGHENY LUDLUM
STEEL CORPORATION — PITTSBURGH, PA.
Branch Offices in AL *Principal Cities*

News of Industry

• • •

Photo by Harris-Ewing

NELSON'S THINKERS: The 3-man planning committee which acts in an advisory capacity to Donald M. Nelson, WPB chairman, left to right: Thomas C. Blaisdell, assistant director of the National Resources Planning Board; Fred Searles, consultant on ordnance, ammunition division, U. S. Army; and Robert R. Nathan, assistant director of progress reports, War Production Board.

Strict Control of Structural Steel Seen A Possibility

• • • **Placing structural** steel under strict allocation may be found necessary soon, to assist the most vital war construction, sellers of structural steel in the East indicated early this week.

Several factors have contributed to the intense demand for structural steel. In addition to vast factory building expansion, the mighty shipbuilding program has taken much structural steel. Contracts for the construction of more merchant ships were awarded in the United States in January than ever before in the history of the world in one month. Another factor in the picture has been the necessity for enlarging U. S. steel production capacity from ore mines to finishing mills.

Tremendous demand has arisen for reinforcing bars recently, part of it caused by the trend toward concrete construction due to inability to get structural steel. Next can be expected the use of green wood for factory buildings, built purely for temporary use during the present national emergency.

Meanwhile, specific recommendations for conservation of steel in a wide range of uses have been made to WPB by the Engineers' Defense Board, technical group sponsored by the American Society of Mechanical Engineers, the A.I.M.M.E., the American Society of Civil Engineers, Society of Electrical Engineers, Society of Automotive Engineers and the Institute of Chemical Engineers.

In a letter addressed to H. LeRoy Whitney, chief, technical and engineering section, Iron and Steel Branch, WPB, the Engineers' Defense Board suggests changes in Federal specifications to encourage greater salvage activities, the issuance of special appeals for increased salvage of steel regardless of profit possibilities, and adoption by municipalities and political subdvisions of an emergency manual to liberalize types of construction materials, working stresses, etc., to effect material reductions in quantities of steel used.

Recommending immediate preparation of manual agreed upon by all commercial, technical and military interests, the Board urges that its provision be made applicable to all structures needed for the national emergency, bearing in mind that many will be of a temporary nature.

It urged also that steel may well be conserved in bridge construction by recognizing as standard for the design of railway bridges, the 1941 edition of the Specifications for Steel Railway Bridges of the American Railway Engineering Association.

The letter states, in part:

"On the matter of your request for advice as to recommendations of Harry Diamond of the Elizabeth Iron Works, it is the Board's opinion that the shortage of steel-industry capacity to produce plates is acute, and that Mr. Diamond's scheme for using scrap ends of wide-flange beams for base plates is workable and practicable. It should be borne in mind, however, that this is only one of many possible schemes which might be used for substituting structural shapes for plates, such as the use of steel grillages, etc. Much could undoubtedly be accomplished in the saving of plates if the OPM were to issue a request to designers and users of structural steel that they substitute steel shapes for plates wherever possible.

"Reinforced concrete design stresses used on emergency structures should conform to the latest New York City Building Code requirements, which permit the following tensile unit stresses in reinforcing steel:

Structural grade billet steel, 18,000 lb. per sq. in.

Intermediate grade billet steel, 20,000 lb. per sq. in.

Steel with yield point in excess of 50,000 lb. per sq. in., 40% of the yield point but not to exced 24,000 lb. per sq. in.

"The Board recommends that a manual be prepared within the shortest possible time by repre-

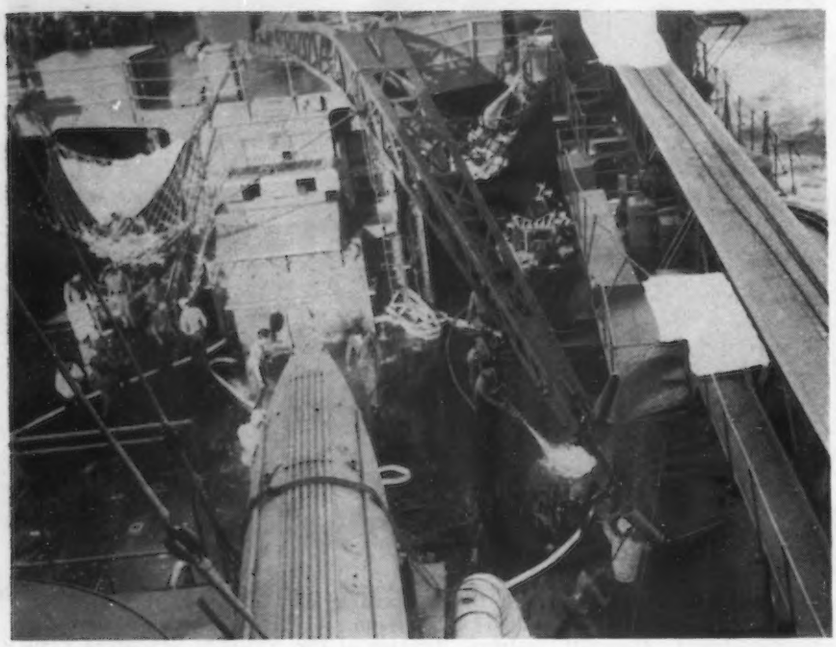
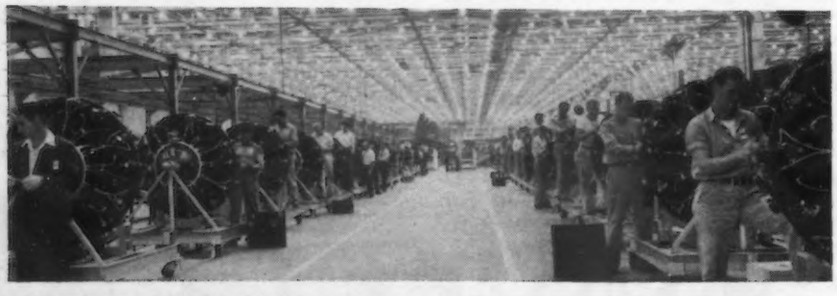


Photo by Wide World

BLACK AND WHITE: The black spot on the floor of this U. S. warship is a hole made by a Japanese bomb during the Navy's attack on the Marshall Islands. The white spot was painted in by the censor. Crewmen quickly put out the fire caused by the bomb.

Photo by Harris-Ewing

CHRYSLER'S TANK OUTPUT GROWS: Well ahead of schedule, tank production at Chrysler's tank arsenal is now coming off three assembly lines, as shown above.



FLOW OF PLANE PARTS: A flow of parts is a prerequisite to mass production. Here in one of Douglas Aircraft Co.'s plants are long rows of new airplane engines, one of countless items of equipment flowing to that assembly plant from suppliers all over the country. The engines are inspected, accessories are checked and final touches applied before installation in military planes rolling down adjoining assembly lines.

sentatives of such national organizations as the American Standards Association, governmental departments, particularly the Army and Navy, steel, concrete, and lumber institutes, representatives of engineering societies, and of the fire underwriters. This manual should be made applicable to all structures needed for the national emergency, bearing in mind that many will be of a temporary nature. In order to accomplish the purposes of such a manual, namely, to conserve critical materials, it should: Liberalize working stresses; reduce live loads for which structures are proportioned, to actual safe maximum conditions; encourage the use of plain masonry wherever possible, as in footings, retaining walls, and the like; liberalize the use of wood for the construction of roofs and roof structures; discourage, and in some cases, prohibit the use of steel for the construction of items where less critical materials such as wood, plastics, concrete, and gypsum can be used instead, for instance, steel pipe piles and sheet piling, steel floors, window sash and doors, partitions, guards at platform edges, etc.,

"In regard to bridge construction, a careful study should be made of actual load requirements for each structure, and the minimum live load consistent with such requirements adopted.

"The use of steel not required by computed stresses, as in fascias and other architectural members and in increased thicknesses to provide against loss of metal by corrosion, be reduced to a minimum; and that houses, walkways, and other accessory portions, in which steel construction would normally be used, be made of timber, concrete, or other readily available materials."

'41 Auto Registrations Exceed All Years But '29

Detroit

• • • **New passenger car** registration in the United States during 1941 reached a total of 3,731,166 units, surpassing all previous years in the history of the industry, except 1929, despite production quotas in effect during the last quarter, R. L. Polk & Co. announced. Truck registrations reached an all-time high of 647,697 units.

Steel Firms Hit at Compromise Clause

• • • **The maintenance-of-union-membership** clause was attacked last week by Bethlehem Steel Co. and Republic Steel Corp., in statements issued in connection with the dispute between "Little Steel" and the SWOC now before the National War Labor Board in Washington.

Asserting that the so-called compromise Marshall Field clause is a "cleverly camouflaged closed shop," Bethlehem declared it unacceptable. Equally outspoken was the statement of Republic which termed the clause as "the closed shop under a different form."

Negotiations between SWOC and both companies broke down in New York recently. The case was certified to the War Labor Board and the hearing was scheduled to begin Feb. 24.

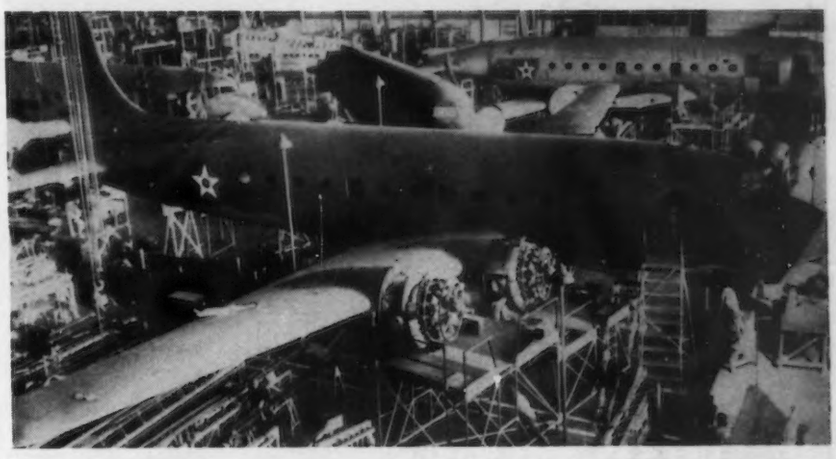
Bethlehem's statement follows:

"Reports in today's papers indicate that at the forthcoming hearings of the steel cases before the National War Labor Board the chairman of the board intends to sponsor the so-called Marshall Field maintenance of union membership clause as a compromise in the closed shop issue. We shall be surprised if the chairman does that.

"The Marshall Field clause is just one more confusing name for the same old idea. It is a cleverly camouflaged closed shop; and the public should not be and, as we believe, will not be fooled by it.

"President Roosevelt stated on Nov. 14, 1941, that 'The Government of the United States will not order nor will Congress pass legislation ordering the so-called closed shop.' The real question before this country today is national security, not union security. Every man should have the right to work without being under pressure to participate in any particular scheme for any kind of membership security.

"We have made wide inquiry, but we have not found that any steel company regards the supposed compromise as anything other than the closed shop partially concealed by a new smoke screen and on that account entirely unacceptable."

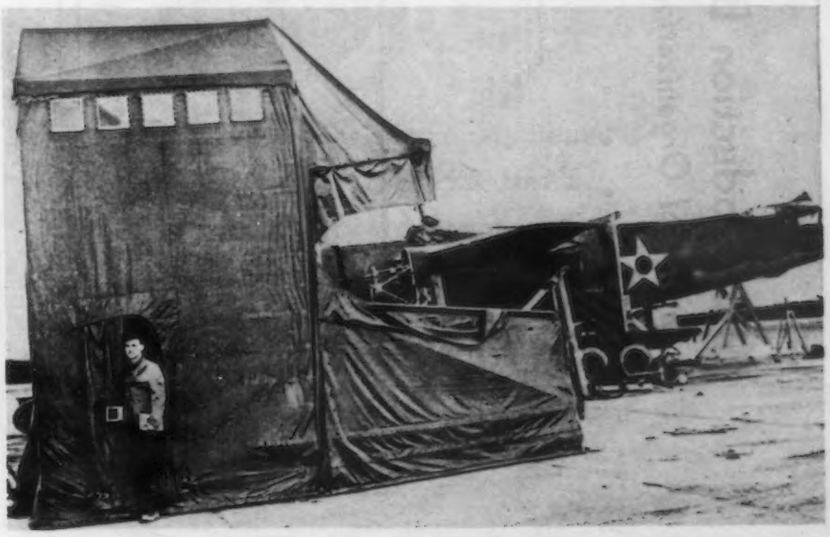


AP and British Combine Photo

NEW GIANT PLANES: On both sides of the Atlantic great troop-carrying and bombing planes are being constructed. The mammoth ships in the top photo are the Army's newest transport planes, the Douglas C-54, one of which was recently given a test flight. The Short Stirling bomber, below, is said by the British to be the heaviest airplane in regular use anywhere in the world. It can carry eight tons of bombs, weighs 30 tons when loaded, has a speed of 300 mph. and a range of more than 2000 miles.

U. S. MOBILE MACHINE SHOP: This photograph, taken somewhere in the Pacific Northwest, shows a mobile machine shop used for overhauling airplane engines and making other repairs.

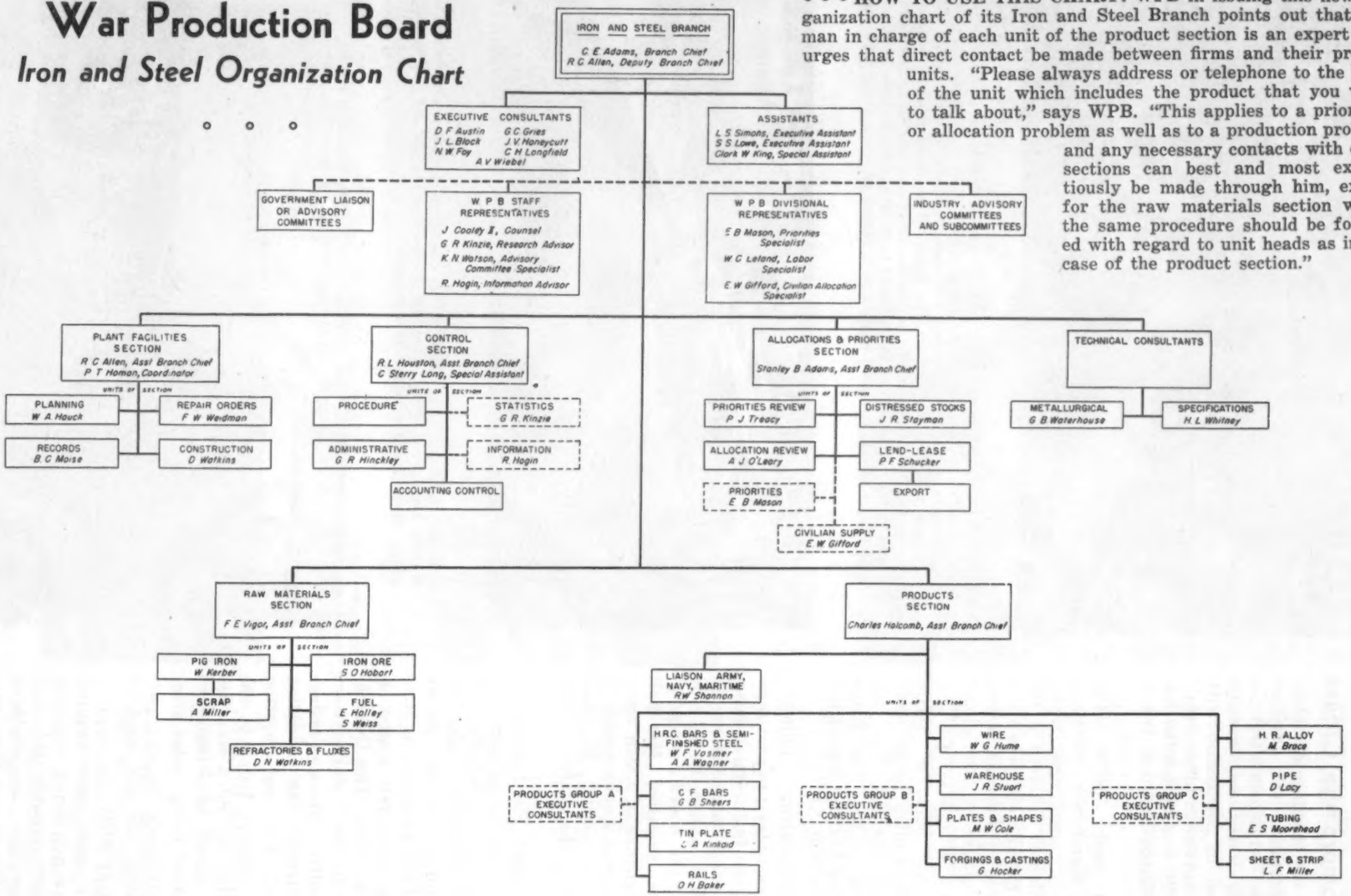
Photo by International



War Production Board

Iron and Steel Organization Chart

o o o



• • • **HOW TO USE THIS CHART:** WPB in issuing this new organization chart of its Iron and Steel Branch points out that the man in charge of each unit of the product section is an expert and urges that direct contact be made between firms and their proper units. "Please always address or telephone to the head of the unit which includes the product that you want to talk about," says WPB. "This applies to a priorities or allocation problem as well as to a production problem and any necessary contacts with other sections can best and most expeditiously be made through him, except for the raw materials section where the same procedure should be followed with regard to unit heads as in the case of the product section."

New Setup Announced For Iron and Steel Branch

Washington

• • • **R. C. Allen,** former head of the raw materials section was made deputy branch chief and head of the reorganized plant facilities section of WPB's Iron and Steel Branch. Announcement of the reorganization was made on Wednesday of last week by Branch Chief C. E. Adams, who said that the purpose is to place in charge of each branch unit an expert on the particular phases of steel assigned to the unit.

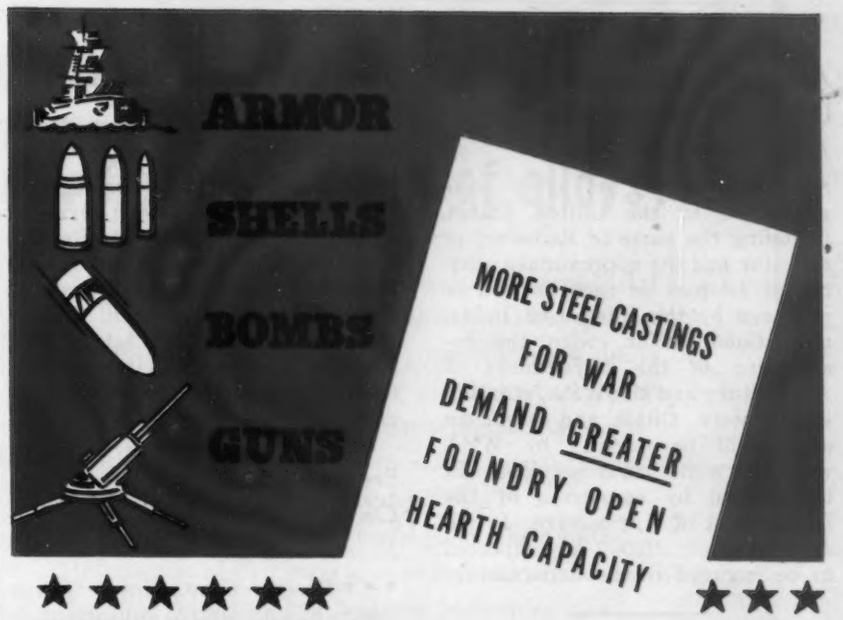
The new setup establishes six sections in the branch. The sections and their heads are: Plant Facilities, Mr. Allen; Raw Materials, Frank E. Vigor; Allocations and Priorities, Stanley B. Adams; Steel Products, Charles Halcomb; and Controls, R. L. Houston.

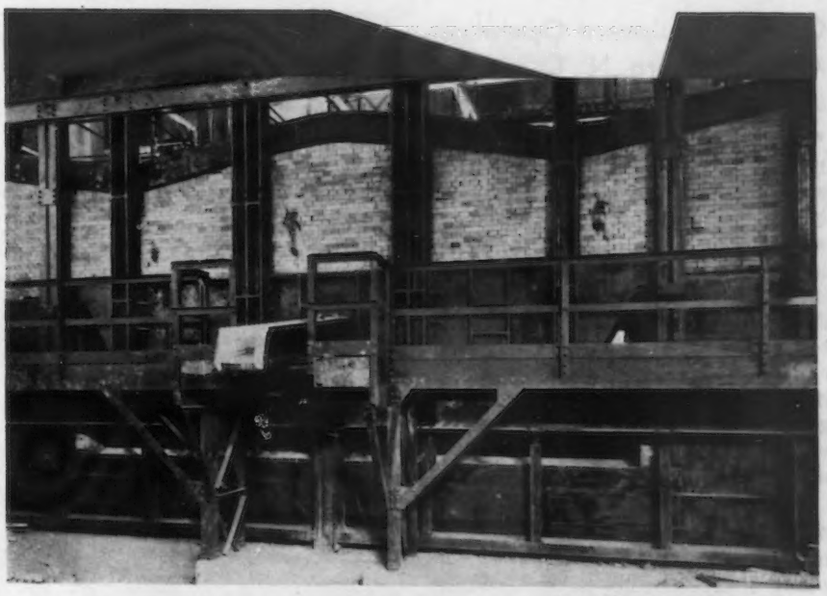
All of these assistant branch chiefs have been previously connected with the branch.

Branch Chief Adams told THE IRON AGE that the "reorganization is a matter of evolution" and denied published reports that it was a "shakeup" due to rows over the expansion program, delayed deliveries and differences of the branch with other government agencies over supplies, specifications and collateral matters. When Mr. Adams became head of the branch about two months ago, it was pointed out, it was a small, loosely knit organizations of 125 employees. With the growing defense problems common to a basic industry such as steel, it was necessary to expand and reorganize the branch, which now has over 400 employees dealing with the ever-increasing demands for steel and the accompanying multiplicity of questions of priorities, allocations, quotas, specifications and technical details.

Copper Report Changed

• • • **A change in** reporting procedure for copper and copper alloy scrap dealers has been announced by the Copper Branch, WPB. Under order M-9-d, dealers have been required to report by the 10th of each month on Form PD-120 to the Copper Branch. Hereafter, they will report on Form PD-249 to the Bureau of Mines, Washington, D. C.





Swindell 40-ton Open Hearth Furnace—one of many serving the metallurgical industry.

SWINDELL

builds to this year's requirements of MORE TONS PER HEAT . . . through forward design and construction. Send in your inquiries for additional data *now!*

SWINDELL-DRESSLER Corporation

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES SINCE 1900

PITTSBURGH, PA.

Attempts to Compile List of All Graveyards

Philadelphia

• • • **A directory** of every auto graveyard in the United States, including the name of its owner or operator and the approximate number of jalopies on each lot will be prepared by the Bureau of Industrial Conservation, with the cooperation of the Department of Agriculture and the WPA, starting immediately. Cities and suburban areas will be covered by WPA workers, while rural sections will be checked by employees of the Department of Agriculture. In all, approximately 30,000 are expected to be engaged in the undertaking.

Open Pit Equipment Operating At Ogdensburg, N. Y.

Cleveland

• • • **The annual report** of M. A. Hanna Co. indicated that its iron ore development at Ogdensburg, N. Y., has progressed to the point where open pit mining equipment is in operation, and the beneficiating plant at the site is nearing completion. In addition to this, ten miles of railroad have been constructed to haul the open hearth lump ore and the high grade low phosphorus sinter which will be produced at the development.

The company expects that work on its open pit manganese mine in Nevada and a beneficiation plant there should be completed during 1942. The company's 1941 operations resulted in a net profit of $4,093,717.

Old Mitchell Car Plant Bought for War Output

Racine, Wis.

• • • **The Massey-Harris Co.,** recently awarded a tank order by the War Department, has purchased the Racine plant of Nash-Kelvinator Corp., the former Mitchell Motor Car Co. factory which was used by Nash for making its LaFayette line, later used for producing light trailers and idle since. It is estimated the plant will require 20,000 men to make its quota and that many firms in this area will share in subcontracts.

New Oil Pipeline Begins Loading Tank Cars

Charlotte, N. C.

• • • **Loading of** tank cars started last week at the eastern terminal of the new Baton Rouge-to-Greensboro oil pipe line. Chief Engineer R. A. Riddle of the Carolinas division of Standard Oil Co. of New Jersey, said Plantation Pipe Line Co. had begun delivering 20,000 barrels daily for loading in cars at Greensboro.

Breeze Co. 90% On War Output

Elizabeth, N. J.

• • • **Breeze Corp., Inc.,** former maker of automotive equipment, is now 99 per cent engaged in war production, having rapidly adapted its equipment to war work in the past 12 months, according to J. J. Masuch, general manager.

EMERGENCY BOW: Here is the U. S. Destroyer Shaw, reported destroyed in the surprise Jap attack on Pearl Harbor, after it arrived at a West Coast port Feb. 17 under its own power. The vessel was equipped with a temporary stub bow and a temporary bridge aft.

Associated Press Photo

Revisions Offered in Screw Jack Standards

Washington

• • • **A considerable** saving in metal would result from approval of a proposed revision of Simplified Practice Recommendation R-97-30—Bell-Bottom Screw Jacks—just submitted to the industry by the National Bureau of Standards, Department of Commerce, says a Department statement.

The revision was worked out by the Standing Committee of the industry in cooperation with the Division of Simplified Practice. The original recommendation, promulgated in 1930, reduced the number of stock sizes from 78 to 38, or approximately 50 per cent. The proposed revision would make a further cut in the number of sizes from 38 to 27, or about 29 per cent, giving an over-all reduction of 79 per cent in the number of fourway head type screw jacks.

Mimeographed copies of the proposed revision may be obtained on request from the National Bureau of Standards, Washington, D. C.

Columbia Stack is Relined in 30 Days

San Francisco

• • • **What is believed to be** a world record for speed in relining a blast furnace is claimed by Columbia Steel Co., subsidiary of United States Steel Corp. The record, 31 days for the complete job, was established at the Ironton blast furnace operating near Provo, Utah, and knocks some twenty days off records previously established by eastern plants, Columbia officials say. The Ironton furnace is the only blast furnace operating west of the Rocky Mountains.

Sheet and Tube Co. Reports Net Profit of $16,124,000

Youngstown

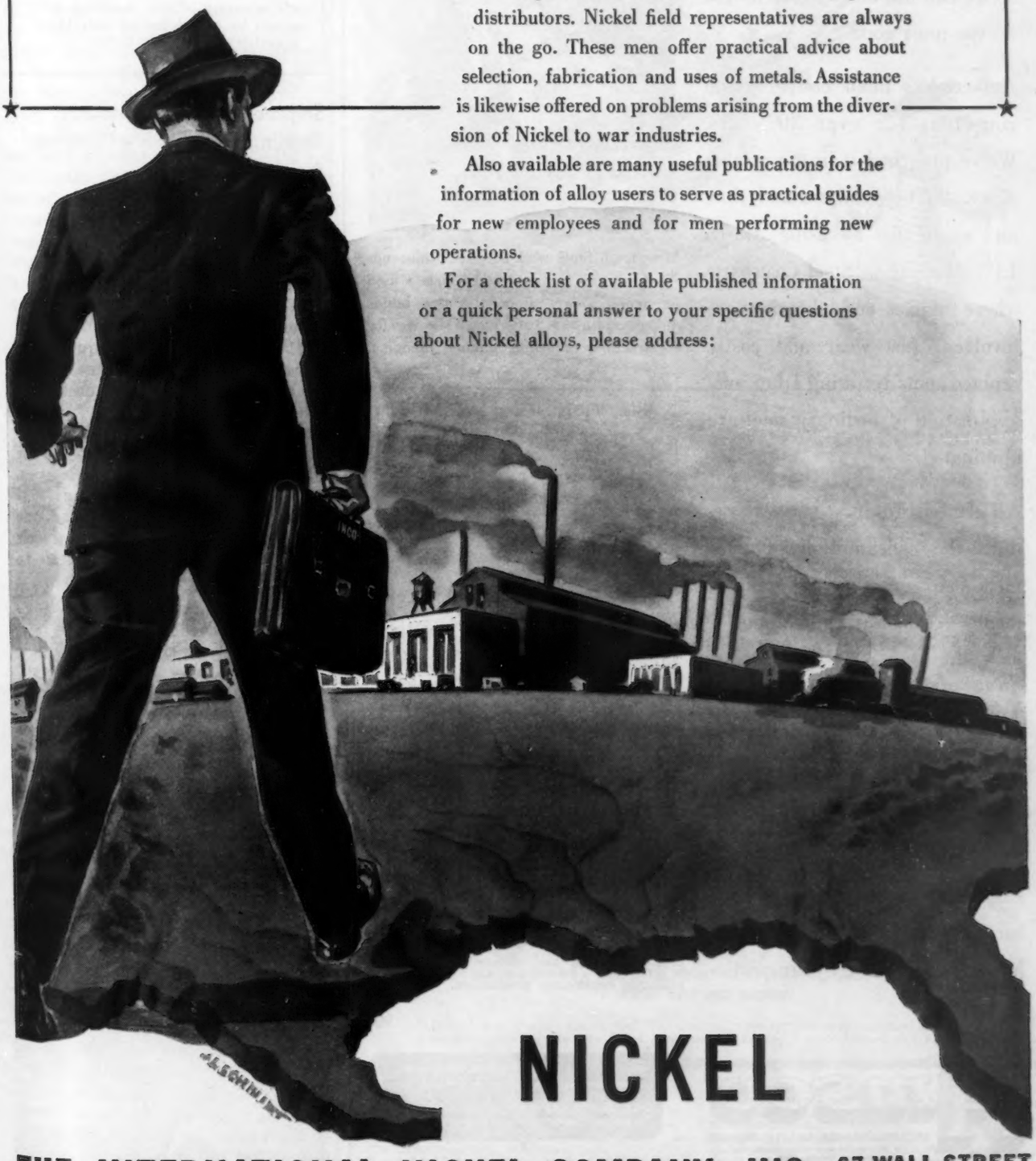
• • • **Youngstown Sheet** & Tube Co. reports 1941 earnings of $16,124,000, the largest annual profit scored by the company since 1929. After preferred dividends, earnings were equivalent to $8.89 a common share, as against $5.96 in 1940, when $10,815,568 was earned. Federal taxes in 1941 amounted to $21,500,000.

ON THE MARCH to aid users of alloys...

FIELD offices are maintained by International Nickel's Development and Research Division and by qualified distributors. Nickel field representatives are always on the go. These men offer practical advice about selection, fabrication and uses of metals. Assistance is likewise offered on problems arising from the diversion of Nickel to war industries.

Also available are many useful publications for the information of alloy users to serve as practical guides for new employees and for men performing new operations.

For a check list of available published information or a quick personal answer to your specific questions about Nickel alloys, please address:



NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

We've Helped Others *to Save Defense Materials* For Many Years!

A war of resources and resourcefulness breaks out and a nation becomes conservation conscious. We've got to save vital materials so we can use them where they'll do the most good.

Amsco has been conservation conscious for over 30 years. We've preached it in the market place. We've demonstrated time and again that by using Amsco 13% Manganese Steel Cast parts where impact and abrasion are involved, fast wear and costly replacements resulting from misapplication of ordinary steel are eliminated.

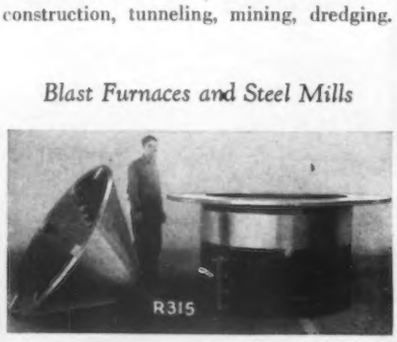
All Amsco products serve to reduce the consumption of vital metals by minimizing replacements — thus saving man-power as well.

You can help yourself and help the defense effort by applying Amsco Manganese Steel wearing parts to equipment that is subjected to heavy impact and abrasion. Amsco engineers and metallurgists will assist in adapting Manganese Steel to your particular needs.

Amsco Manganese Steel Aids Defense by Conserving Steel in Coal Mining

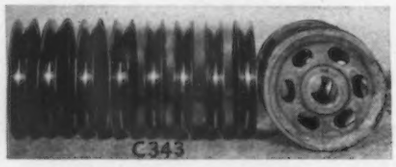
Manganese Steel work-hardens, withstands shock stresses, outlasts other metals used for power shovel dippers. Amsco builds dippers and makes parts for all shovels—for construction, tunneling, mining, dredging.

Blast Furnaces and Steel Mills



The men who know steel best use Manganese Steel for equipment parts exposed to shocks and abrasion.

For All Industry



Manganese Steel Sheaves represent many applications in factory, field and mine that save time and money and help to maintain continuous production.

Amsco

AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRAKE SHOE & FOUNDRY CO.
Chicago Heights, Illinois

Manganese Steel Castings for shocks and abrasion.
Chromium-Nickel Alloy Castings for heat and corrosion resistance.
Power Shovel Dippers. Dredge and Industrial Pumps.
Welding Materials for reclamation and hard-surfacing.

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO. OFFICES IN PRINCIPAL CITIES

Steel Institute Meeting on May 21

• • • The 51st general meeting of the American Iron and Steel Institute will be held at the Waldorf-Astoria, New York, on Thursday, May 21, 1942. Program of the meeting has not yet been announced. Attendance at all sessions of the meeting will again be restricted to individual members of the institute.

Shipments to Warehouses Running 50% Below Quotas

Pittsburgh

• • • **Highly concentrated** high priority steel orders have already affected shipments to warehouses to a substantial degree. Although warehouses are allowed 100 per cent of the material shipped to them during the first quarter of 1941 as their quarter quota, in some instances such shipments fell to 50 per cent the last quarter of 1941, with shipments so far this quarter to many warehouse interests being received at a rate below 50 per cent of the allowable quota. Because most warehouse material has low ratings, it is believed the push to produce heavier war goods will further cut shipments to warehouse sources.

Two Destroyers Launched By Federal Shipbuilding

Kearny, N. J.

• • • **Two destroyers** were launched here Feb. 20 by Federal Shipbuilding & Dry Dock Co., a United States Steel Corp. subsidiary. The vessels, the U. S. S. Duncan and the U. S. S. Lansdowne, slid down the ways six months and twenty days after keel laying.

Wage Increase Ends Three-Month Controversy

Lackawanna

• • • **An hourly wage increase** of 7½c. to more than 200 production and maintenance employees of the Spring Perch Co., Inc., this week ended nearly three months of dispute between the company and the SWOC. Five cents of the increase is retroactive to Nov. 28, when the union first sought a 10-cent hourly increase.

Elliott New Chief of Stockpiling and Shipping

Washington

• • • **Dr. William Y. Elliott**, Belmont, Mass., has been appointed as Chief of the Stockpiling and Shipping Imports Branch. He succeeds Howard C. Sykes, recently named executive secretary for the United States of the Combined Raw Materials Board. Dr. Elliott has been Assistant Chief of the Branch. Dr. Elliott is professor of government at Harvard University, where he has been a member of the faculty since 1925.

Dr. Ernest W. Reid, Pittsburgh, has been appointed Chief of WPB's Chemicals Branch. Dr. Reid has been Assistant Chief of the Branch since its organization. He replaces Dr. Edward W. Widlein, also of Pittsburgh, who will be retained in the organization as senior consultant.

DOUGLAS EXECUTIVE: Victor E. Bertrandias (below), Douglas Aircraft Corp. vice president in charge of materiel, directs the purchase and shipments to Douglas plants in the subcontracting program by which Douglas has ordered $125 million of sub-assemblies from the automotive and other manufacturing companies.

Faster Driving • Fewer Operations • Stronger Fastenings = 50% Less Assembly Cost with Phillips Screws!

Consider the more frequent use of power drivers with Phillips Screws. There's no danger of driver point slipping from a Phillips recess, so there's no need to go slow. Phillips cuts actual screw-*driving* time to a fraction.

Add the saving through eliminating the extra work required with slotted screws—drilling pilot holes, two-handed starting, withdrawing crooked screws, driving in awkward positions, etc. Phillips Screws set up tight—without split screw heads or burrs — at an average cost saving of 50%.

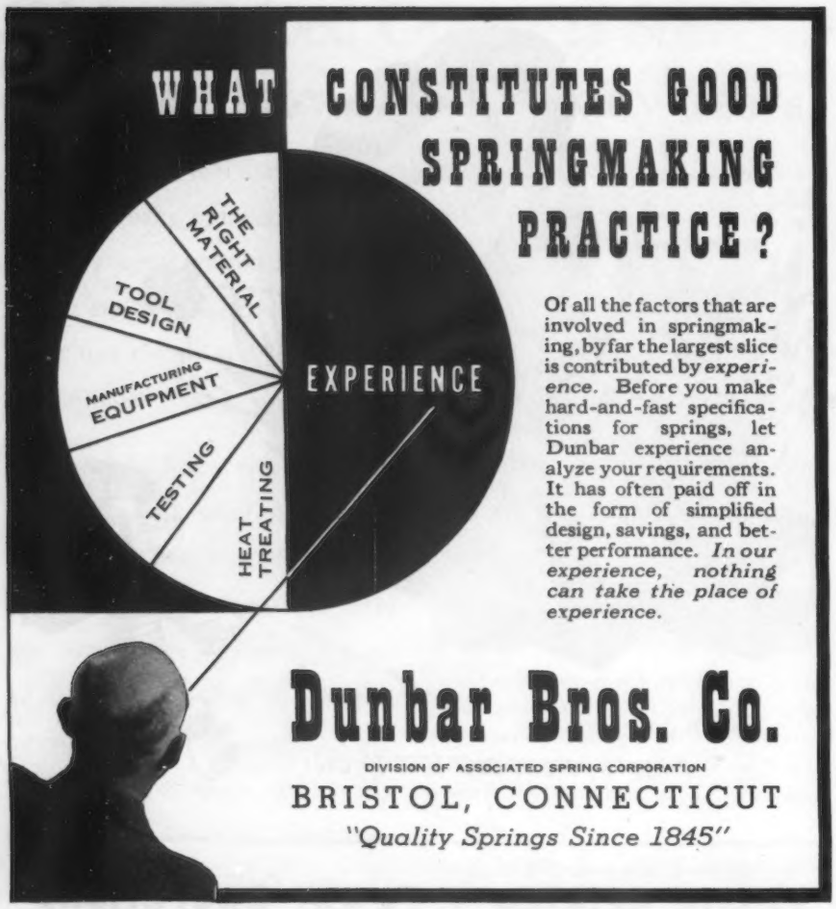
Busy defense plants are using Phillips for double-quick assembly *speed.* Non-defense plants use Phillips for 50% less assembly *cost.* Get the facts from one of the firms listed below.

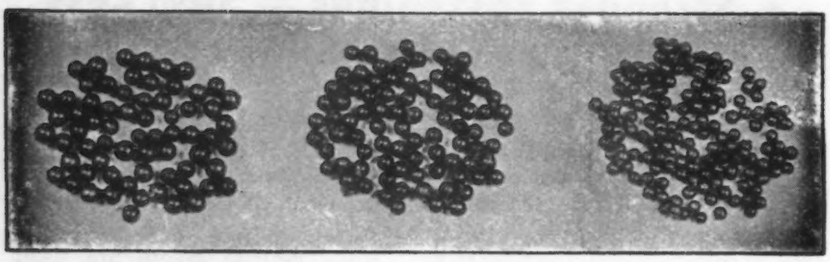
PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.


WHAT CONSTITUTES GOOD SPRINGMAKING PRACTICE?
THE RIGHT MATERIAL
TOOL DESIGN
MANUFACTURING EQUIPMENT
TESTING
HEAT TREATING
EXPERIENCE
Of all the factors that are involved in springmaking, by far the largest slice is contributed by experience. Before you make hard-and-fast specifications for springs, let Dunbar experience analyze your requirements. It has often paid off in the form of simplified design, savings, and better performance. In our experience, nothing can take the place of experience.
Dunbar Bros. Co.
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"Quality Springs Since 1845"



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

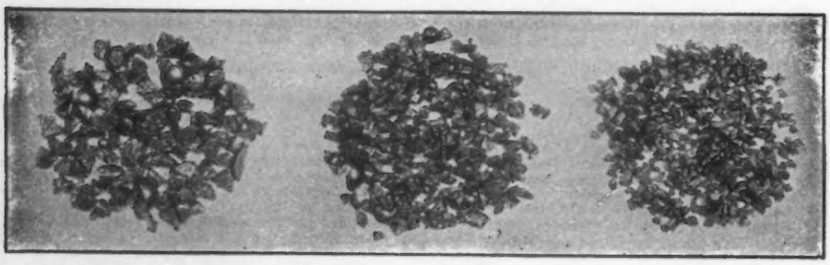
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



Higher Output Credited To Desulphurization

Birmingham

• • • **Desulphurization** offers the means of making more and better pig iron and steel and today it is spreading from the foundry industry to the iron and steel industry, George S. Evans, metallurgist, Mathieson Alkali Works, Inc., New York City, told Southeastern foundrymen here Feb. 20.

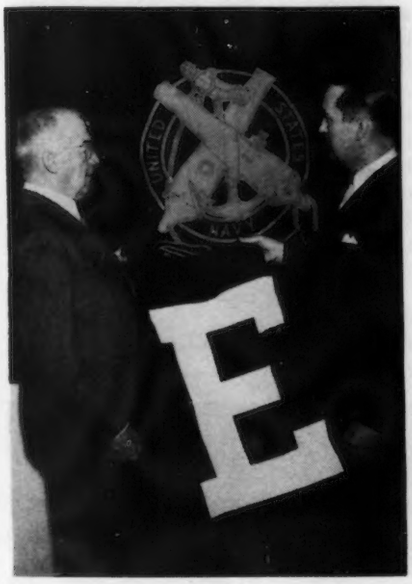
Speaking at the tenth annual foundry practice conference, sponsored by the Birmingham District Chapter, American Foundrymen's Association, Evans said desulphurizing, in many instances, offers a means of reducing costs in the iron and steel industry, as well as a means of effecting some increase in production.

Discussing various developments in metallurgy, Evans asserted that one of the recent developments in rapid metallurgy, making use both of desulphurizing and dephosporizing by ladle treatment, includes cupola - converter electric furnace triplexing. This system, he said, offers the means of more than doubling the output of electric furnace units within a minimum of time and expense for buildings and equipment.

"In this process," he said, "low grade steel scrap unsatisfactory for either open hearth or electric furnace will be melted in the cupola together with pig iron or ferro-silicon to provide an iron with 1.25 to 1.50 per cent silicon content. The metal will be desulphurized in the ladle with soda ash between the cupola and converter; and the blown metal dephosphorized by ladle treatment between the converter and electric furnace. Upwards of 70 per cent or more of either or both sulphur and phosphorus in the iron will be removed by ladle treatment.

"**Equipment** for the process can be installed at much lower cost and in considerably less time than required to build and install similar electric furnace capacity. It is believed ingot costs by this process will compare favorably, both now and under post-war conditions, with the cost of ingots of comparable quality made with cold charges. The process will be used in the production of plain carbon and alloy steels or ordnance grades," Evans asserted.

Other speakers at the three-day



"E" FOR SOUTH BEND LATHE: The Navy "E" for excellence has been awarded the South Bend Lathe Works at South Bend, Ind., for production of ordnance materiel John J. O'Brien, chairman, and R. E. Frushour, president, represented the company at the presentation ceremony.

meeting of the conference, which opened Feb. 19 at the Tutwiler Hotel, were Donald J. Reese, metallurgist, International Nickel Co., New York; E. E. Woodliff, chief engineer, Harry W. Dietert Co., Detroit, Mich.; R. E. Kennedy, Chicago, Ill., secretary of the American Foundrymen's Association; Maj. Frederick Hausmann, Birmingham Ordnance District, and I. R. Wagner, vice-president, Electric Steel Castings Co., Indianapolis, Ind.

Morris W. Zack Buyer Of W. H. Davey Steel Co.

• • • **A meeting of** the stockholders of the W. H. Davey Steel Co. to determine definite approval of its sale revealed the fact that the buyer of this property is Morris W. Zack of the Zack Metals Co., Detroit. Harry L. Berno, president of Davey Steel, indicated operations would continue until present inventories are liquidated by about May 1, when the plant will be turned over to its new owners. The new owner of the plant, Zack, may install new equipment to expand it in the production of plates and galvanized sheets.

Salute to Mill Supply Houses

As a company we are proud of our affiliations with the mill supply houses of America. • Here are men who see above and beyond today's profit. They think and sell in terms of QUALITY. They have built permanent reputations through their sponsorship of first line merchandise. • **AMERICAN CHAIN** could never have won its way into their warehouses unless it met their severe and superior standards. • Although their distribution of goods is now determined by priority ratings, we know that they are giving valuable service and advice in the proper *selection, application, use, inspection* and *maintenance* of essential products such as, for example, the **WELDED AND WELDLESS CHAINS** which we make. • Now that every metal is in great demand, this special cooperation is in high favor among industrial men.

AMERICAN CHAIN DIVISION • YORK, PENN.

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

Dunking Improves Strength

■ We have no accurate statistics as to the relative merits of dunked and undunked doughnuts . . . but we do know that dunking makes a world of difference in the strength of bolts.

As long ago as the days of the renowned Damascus swords, dunking . . . or quenching . . . played an all important role in the heat treating of steel. These keen blades were quenched by thrusting them fiery hot through the thigh of a slave. Through this "baptism in blood" these swords were supposedly endowed with courage and strength bevond all others.

There is no superstition in the modern heat treating of bolts and nuts. Carefully controlled heating cycles and scientific quenching in specially developed quenching fluids give bolts unusual levels of strength, hardness and ductility with better fatigue values. They can be as tough as armor plate, or given a carburized case harder than glass, with a strong, durable core. Other heat treating operations at various stages of manufacture give these fasteners the exact physical properties required for each specific job.

Oliver's heat treating facilities are complete and modernly flexible to produce every physical property required in your fastener specifications. Submit your fastening problems to Oliver for an expert opinion and a prompt solution for any and all War Production metal fastener requirements.

OLIVER
IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

NEWS OF INDUSTRY

Advisory Board Named For Auto Parts Industry

Detroit

• • • **Automotive parts industry** advisory board of 11 members has been announced by R. L. Vaniman, deputy chief of WPB's automotive branch. The members of the subcommittee and their commercial connections are: C. E. Hamilton, Richmond, Ind., president of Automotive Gear Works, Inc.; C. C. Carlton, Lansing, Mich., vice-president of Motor Wheel Corp.; C. S. Davis, Chicago, president of Borg-Warner Corp.; Burke Patterson, Cleveland, assistant to the president of Thompson Products Co.; J. D. Eby, St. Louis, Mo., Wagner Electric Corp.; R. F. Koch, Chicago, service manager of International Harvester Co.; M. D. Douglas, Detroit, manager of the parts and accessories division, Chevrolet Motors Co.; F. C. Bahr, Detroit, vice-president, Motor Parts Corp., Chrysler Corp.; V. E. Doonan, Dearborn, Mich., general sales executive of Ford Motor Co.; B. F. Morris, West Orange, N. J., executive vice-president of Thomas A. Edison, Inc.; Max Miller, Pontiac, Mich., service merchandising manager of Yellow Truck & Coach Co.

Superior Ore Consumption Sets Record in January

Cleveland

• • • **The official** report of the Lake Superior Iron Ore Association for January indicates an all-time record consumption of 7,158,423 gross tons of Lake Superior iron ore by furnaces in the United States and Canada. Of this unprecedented total, U. S. furnaces accounted for 6,960,303 gross tons. This resulted in a decline in iron ore stocks at United States and Canadian furnaces and on Lake Erie docks to 33,919,063 gross tons, from 40,456,893 gross tons a month earlier. Thus, despite the high rate of consumption, stocks on hand continue higher than the 29,794,047 gross tons on hand on Feb. 2, 1941. Of present iron ore stocks, 28,597,793 gross tons are at United States furnaces, 1,029,384 tons are at Canadian furnaces and 4,291,886 gross tons are on Lake Erie docks in the United States. On Feb. 1, 1942, 171 United States furnaces and 7 Canadian furnaces were in blast, while ten furnaces here and one in Canada were idle.

The Story of the Missing Fastener

■ Slowly the massive hangar doors rolled back and into the early morning mists trundled a gleaming airship of terrific proportions . . . the world's largest bombing plane readied for its final trial flight. Seven times before, this tense moment had occurred in utmost secrecy, but today the field was crowded with military officials, designers, research engineers and brass hats.

In a roped-off area a mechanic stood with other workmen, he heard the four giant motors "rev-up"; saw the "all clear" signal flash from the

. . . not this kind

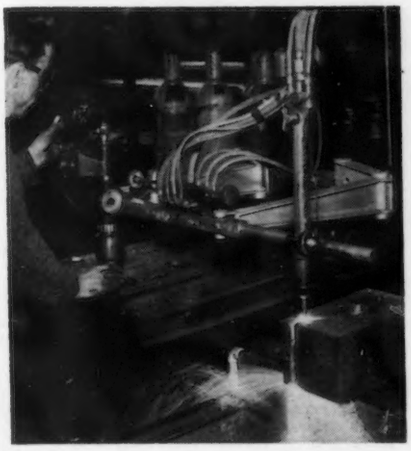
tower. All four motors thundered and the ship rolled down the runway and into the air . . . then he started to remember. The left landing gear . . . he had re-assembled it yesterday . . . that bolt that fit so snugly . . . had he put it in after he was called away? Oh! sure, Joe inspected the job . . . but did he notice?

Right then, nearly three years of intensive aircraft design and construction, an experiment costing over $3,000,000 and the pride and hopes of countless men depended . . . not on correct design, accurate construction or safety factors . . . but on the absence or presence of a *single bolt.*

This story is fictional to illustrate the supreme importance and necessity of nuts, bolts and fastenings to aviation and every industry. No other means of fastening will do all of the jobs done by nuts, bolts and rivets.

There is *nothing fictional* about the ability of Oliver Iron and Steel Corporation to produce the metal fasteners you use, dependably, uniformly excellent and promptly for all essential purposes.

OLIVER
IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS



MAKING GUNS FASTER: The Airco "45" high speed machine cutting tip with divergent nozzle makes short work of cutting out a semi-circular piece from this 6-in. thick alloy steel block used in a field gun. This block must be cut to close tolerances in the minimum amount of time. Use of this new tip reduces cutting time 20 to 30 per cent.

Woodward Iron Co. Sales $11.3 Million in 1941

Birmingham

• • • **Woodward Iron Co.** operated at the highest rate in its history throughout 1941, and sales for the year amounted to $11,310,871.54 as compared with $10,499,821.07 for 1940, the annual report of H. A. Berg, to the company's stockholders, says.

"Capacity operation seems assured for the duration of the war; however, increasing costs and still higher tax rates may be anticipated," Berg asserted in part.

Net earnings for the year, after providing a reserve of $250,000 for general contingencies, amounted to $1,013,662.36 or $3.01 per share on 336,223 shares of common stock outstanding Dec. 31, 1941, as against $4.27 per share for 1940 on 334,000 shares outstanding.

Berg said that undertaking the development of Pyne ore mine in 1941 became necessary to supplement and replace the red ore supply from present operation because of full production requirements.

"A shaft sunk on the Pyne property during 1918 is being utilized," he said. "Construction and complete development of Pyne mine will cover an additional period of about two years, and total expenditures are estimated at nearly $2,000,000."

Medart Announces!

NEW Cable-Core V-BELTS

Outlast All Others

1—Black Jackets are Tougher

New, groove-gripping unit jackets of special flexible fabric filled with tough, live black rubber. Transmit maximum power from and to the sheaves. Give "All-Out" defense protection to the vital working parts within.

2—"Neutralized" Cable-Cores Defy Hard Work

Parallel "Cable-Core" construction places load carrying cable-like cords in the neutral section where deteriorating "flexations" are at an absolute minimum. "Cable-Cores" are composed of powerful fiber strands, specially woven and prestretched, then impregnated and imbedded in selected cool-running, slow-aging rubber compound. A 100% Tough Construction.

3—Built-In, Uniform Flexibility

Stretch-taking section above "Cable-Cores" is made of special extensible rubber compounds. Compression section below "Cable-Cores" is constructed to resist "crimpage" when belts are flexed around pulleys. All sections are consolidated into one balanced unit that will give you "POWER TRAVEL AT REDUCED RATES" — economical, trouble-free operation for top speed production.

4—Tailored to the Grooves

Belts are cured in precision molds to produce exact cross sections that will fit true in the sheave grooves. This positive "groove-gripping" is far more important than matched length if matched belts are to pull together.

— FREE — HELPFUL CATALOGS

Explain All You Need To Know About Power Transmission Equipment

No. 56-V: V-Belts and V-Sheaves
No. 56-G: Gears and Sprockets
No. 66: All Other Power Transmission Equipment

WRITE TODAY

COMPLETE POWER TRANSMISSION EQUIPMENT

SAVE STEEL for DEFENSE Use WOOD PULLEYS

Block, Cap or Arm Type For Every Need

BALANCED CONSTRUCTION

BABBITTED BEARINGS

ALL TYPES

Solid Journal or Split
Plain Babbitted
Wick or Ring Oiling
Rigid Flat or Angle
Ball & Socket Adjustable
And Many Others

Any style—for any purpose. All carefully made, lined-up and finished for long and trouble-free service.

FLANGE COUPLINGS

Permanently Rigid!

Made for installations requiring great driving power and rigidity of alignment. We can furnish this coupling force fitted to our turned and polished Shafting. Inquire about our Service.

You Can Depend Upon Medart

Sheaves—Any Purpose!

Bicycle

Molded Wire Rope, Chain and V-Belts

Manila Rope DRIVES AND ACCESSORIES

For Cable Hoists Sheaves receiving - with steel lined long wearing and economic grooves; or plain grooves.

Correctly designed sheaves, tension carriages (horizontal or vertical), truck hangers, yoke sheaves and tension weights for any type of drive - and for maximum efficiency.

COMPLETE INSTALLATIONS

Power Travel at Reduced Rates

THE MEDART COMPANY

MANUFACTURING ENGINEERS of ALL TRANSMISSION EQUIPMENT

General Offices and Works
3520 DE KALB STREET • ST. LOUIS, MISSOURI

Sales Offices in All Principal Cities

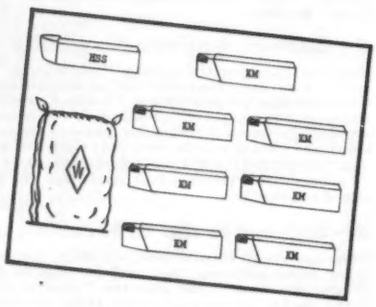
War Contracts Awarded

• • • Below is a list of contracts recently awarded. If you are interested in getting part of this work on a subcontract basis, write, don't telephone, your nearest WPB Contract Distribution office. In making inquiries concerning any of the following items, please refer to the letters and numbers given in the second column.

Contract Item	Firm
Valves	NAF-1006
Valves	NAF-1007
Cylinders, oxygen	NAF-1010
Cylinders, oxygen	NAF-1011
Preheaters	NAF-1013
Diesels	NAF-1017
Lathes	NAF-1019
Semi-trailers	NAF-1020
Cartridges, dummy	NAF-1026
Wire rope	NAF-1027
Control towers	NAF-1028
Lighting units	NAF-1029
Parts, motor	NAF-1031
Lead, pig	NAF-1104
Trucks, motor	NAF-1105
Engine lathes	NAF-1106
Trucks, motor	NAF-1109
Trucks, motor	NAF-1110
Container	NAF-1111
Pumps	NAF-1112
Units, air conditioning	NAF-1113
Water purification units	NAF-1201
Lathes	NAF-1202
Machines, automatic	NAF-1203
Anchors, stockless	NAF-1204
Pumps	NAF-1206
Fittings	NAF-1208
Cable	NAF-1209
Pumps, centrifugal	NAF-1212
Motor generators	NAF-1213
Motor trucks	NAF-1214
Condenser assemblies	NAF-1215
Welding sets	NAF-1217
Chains	NAF-1218
Tools	NAF-1304
Diesel generating sets	NAF-1305
Dental X-ray units	NAC-7901
Steel valves	NAC-7905
Spare stern tube shaft sleeves	NAC-7906
Portable electric sanders	NAC-7908
Wire rope clips & round pin shackles	NAC-7909
Hand taps	NAC-7911
Balancing machine	NAC-7912
Brass tubing	NAC-8004
Phosphor bronze bars	NAC-8005
Abdominal retractors	NAC-8006
Brass crosses, couplings, & brass unions	NAC-8009
Serving trays	NAC-8011
Forceps	NAC-8012
Watches	NAC-8102
Machines, tables, transmitters	NAC-8104
Vises	NAC-8105
Trucks	NAC-8106
Bearing, blocks, brushes, pins, etc.	NAC-8107
Rodmeters	NAC-8108
Squaring shear	NAC-8109
Twist drills	NAC-8110
Ballast pump motor	NAC-8112
Motor generator sets	NAC-8201
Rods	NAC-8207
Spares for reduction gear & related parts	NAC-8209
Dishwashing machine	NAC-8210
Drills	NAC-8211
Drilling machines	NAC-8301
Cable-wire, steel	NAC-8304
Steel tubing	NAC-8308
Chain & rings	NAC-8309
Electric ranges & spare parts	NAC-8310
Acetylene cases & cylinders	NAC-8401
Boiler tube cleaning outfits & spares for same	NAC-8402
Metal cutting nibbling machine	NAC-8404
12-ton comb. hydraulic jacks	NAC-8405
Socket wrench bars and wrenches	NAC-8406
Wrenches	NAC-8407
Metallic steel tubing	NAC-8408
Electric wire	NAC-8409
Roller bearing punches	NAC-8410
Dished brass heads	NAC-8411
Contact makers for attack alarm systems	NAC-8501
Nibbling machines	NAC-8502
Air cooler motor & spare parts	NAC-8511
Pressure gage tester	NAC-8512
Switches	NAC-8602
Flanged fittings	NAC-8603
Steel sleeves	NAC-8604
Chain link fence & hooded backstop	NAC-8607
Soft ball backstop	NAC-8608
Bolts	NAC-8609
Bolts	NAC-8610
Testing machine	NAC-8611
Rotors, motor, etc.	NAC-8702
Synchro generators, motors, etc.	NAC-8703
Refrigeration school equip.	NAC-8704
Plate steel	NAC-8705
Steel bars	NAC-8708
Steel bars	NAC-8709
Engine lathe	NAC-8710
Stirrup pumps	NAC-8711
Die heads	NAC-8712
Sewing machines	NAC-8713
Main condenser air ejector unit & set of spare & tools	NAC-8805

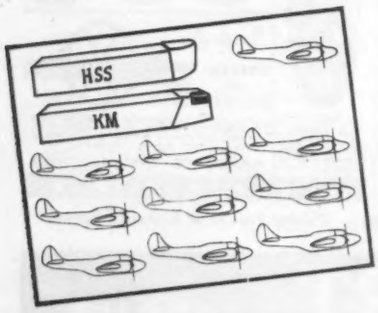
Machine 60 times More Steel per pound of Tungsten Consumed

with KENNAMETAL carbide-tipped tools



A 100 lb. bag of 70% wolframite will make 140 tungsten steel tools weighing 2.1 lbs. each, or 1000 KENNAMETAL-tipped tools of the same size having tips weighing 22.5 grams each. Seven times more KENNAMETAL tools can be made per pound of tungsten consumed, as shown at right.

Each of the above KENNAMETAL tools will turn, bore, or face nine times more steel parts during its useful life as 18% tungsten steel tools (see chart below). By simple multiplication ($7 \times 9 = 63$), it can be seen that KENNAMETAL tools will machine more than 60 times as many steel parts per pound of tungsten consumed than will 18% high speed steel tools.



You can do your part to conserve tungsten and speed up production by specifying KENNAMETAL-tipped tools on your steel turning, boring and facing jobs. Furthermore, the savings in machining time and tool costs resulting from the use of KENNAMETAL will help you reduce production costs to meet post-war competition. Send for our Catalog No. 42.

KENNAMETAL costs no more than other carbides' Write for Price List No. 7 containing new low prices on tools and blanks, effective Jan. 5, 1942.

SALES REPRESENTATIVES FROM COAST TO COAST

McKENNA METALS Co.
144 LLOYD AVE., LATROBE, PENNA.
FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO.
Exclusive of Canada, Great Britain and Possessions

KENNAMETAL
The Accepted
STEEL CUTTING
CARBIDE

Contract Item	Firm
Forceps	NAC-8806
Surgical spotlight	NAC-8807
Refrigerating plants	NAC-8808
Busbar copper	NAC-8809
Electric ranges & spare parts	NAC-8810
Drilling machines	NAC-8811
Socks	NAC-8901
Squaring shear	NAC-8903
Elbows, tees, crosses, etc.	NAC-8905
Water tanks & barrels	NAC-8907
Parts for gyro compass	NAC-8908
Saw filers	NAC-8909
Vises	NAC-8910
Brass	NAC-8911
Steel barrels	NAC-9001
Non-returnable drums	NAC-9002
Electric bake oven & spare parts	NAC-9003
Trucks	NAC-9004
Machining cylinders, assemblies, studs for Pratt & Whitney Aircraft engines	NAC-9005
Sound instrument & recording disks	NAC-9006
Lathe	NAC-9008
X-ray developing tanks & spare parts	NAC-9101
Bulb steel angles	NAC-9104
Chucking reamers	NAC-9105
Bushings, elbows, etc.	NAC-9109
Exhaust elbows	NAC-9111
Motor generator sets	NAC-9112
Navy identification tags	NAC-9205
Nozzles & reversing chambers	NAC-9207
Screws	NAC-9208
R-meter complete with dessicator case & stereoscope	NAC-9211
Wire	NAC-9212
Screws & nuts	NAC-9302
Copper tubing	NAC-9303
Reamers	NAC-9304
Drilling machines	NAC-9306
Press type motor driven brake	NAC-9307
Sockets & ratchets	NAC-9308
Pressure gages	NAC-9309
Steel thrust bearings	NAC-9310
Precision lathe & attachments	NAC-9401
Ball bearings	NAC-9403
Ball bearings	NAC-9404
Winches, electric & mechanical spares	NAC-9405
Steel angles	NAC-9406
Forceps	NAC-9408
Twist drills	NAC-9501
Set of engine spares	NAC-9502
Airplane models	NAC-9503
Tool boxes	NAC-9505
Steel seals	NAC-9506
Spare parts for trimming pump motor—armatures, coils, brushes, etc.	NAC-9507
Cutting tips for style 3000 torch	NAC-9511
Steel cap screws	NAC-9602
Ring compressor, piston ring, blower gear puller	NAC-9603
Steel cutters and saws	NAC-9604
Saw band	NAC-9605
Portable crane	NAC-9612
Coils, booster	NAC-9703
Silver solder	NAC-9704
Gaskets	NAC-9705
Cafeteria equip.	NAC-9706
Cylinder, cylinder heads, piston rings, etc.	NAC-9709
Steel shelving & rotary bins	NAC-9710
Portable cranes	NAC-9711
Castellated steel nuts, screws, bolts, etc.	NAC-9801
Woodworking machines	NAC-9802
Drilling machines	NAC-9803
Organ & cabinet	NAC-9804
Steel cap nuts	NAC-9807
Liquidometer parts	NAC-9808
Propeller, governor unit	NAC-9809
Bronchoscopic outfit	NAC-9810
Ships	NAC-9812
Pinion gears & pawls	NAC-9901
Fire galvanized buckets	NAC-9902
Spare parts for transmitters	NAC-9904
Propellers	NAC-9905
Adapters, handles, wrenches	NAC-9906
Spare parts for anchor or windlass motor	NAC-9908
Phosphor bronze bars	NAC-9909
Bedplate	NAC-9910
Tube nests, complete aircoolers	NAC-9911
Gaskets	NAC-10001
High speed steel short throat chasers	NAC-10002
Parts for Sperry gyro compass equipment	NAC-10004
Elec. heaters	NAC-10005
Steel pipe	NAC-10006
Steel barrels	NAC-10010
Automatic starting compensator	NAC-10011
Gyro compass parts	NAC-10012

Two Stoker Plants Being Converted to War Work

Cleveland

• • • **The Iron Fireman Co.'s** Cleveland plant will be 75 per cent converted to war work by the end of 1942, company officials announced, while operations at its Portland, Oregon, plant would be converted to 95 per cent war work in order to handle some $7,000,000 in war contracts that the company holds. On record sales of $9,427,392 in 1941, the company earned $652,461, after income and excess profits taxes of $663,773, including foreign taxes. Directors declared four quarterly dividends of 30 cents each to be paid March 10, June 1, Sept. 1, and Dec. 1.

ECONOMIZE ON ZINC

with

MEAKER

PROCESS

for Electro-Galvanizing Wire

Even the lightest coatings are uniformly distributed on the wire surface. Control of coating thickness is exact. You can save on zinc, produce more perfect coatings, make more profit with Meaker Process for Electro-Galvanizing Wire.

"A proven success by every test"

WE INVITE YOUR INQUIRY

The MEAKER Company

1635 South 55th Avenue, Chicago

'Little Steel' Case Being Watched for Possible Precedent

Washington

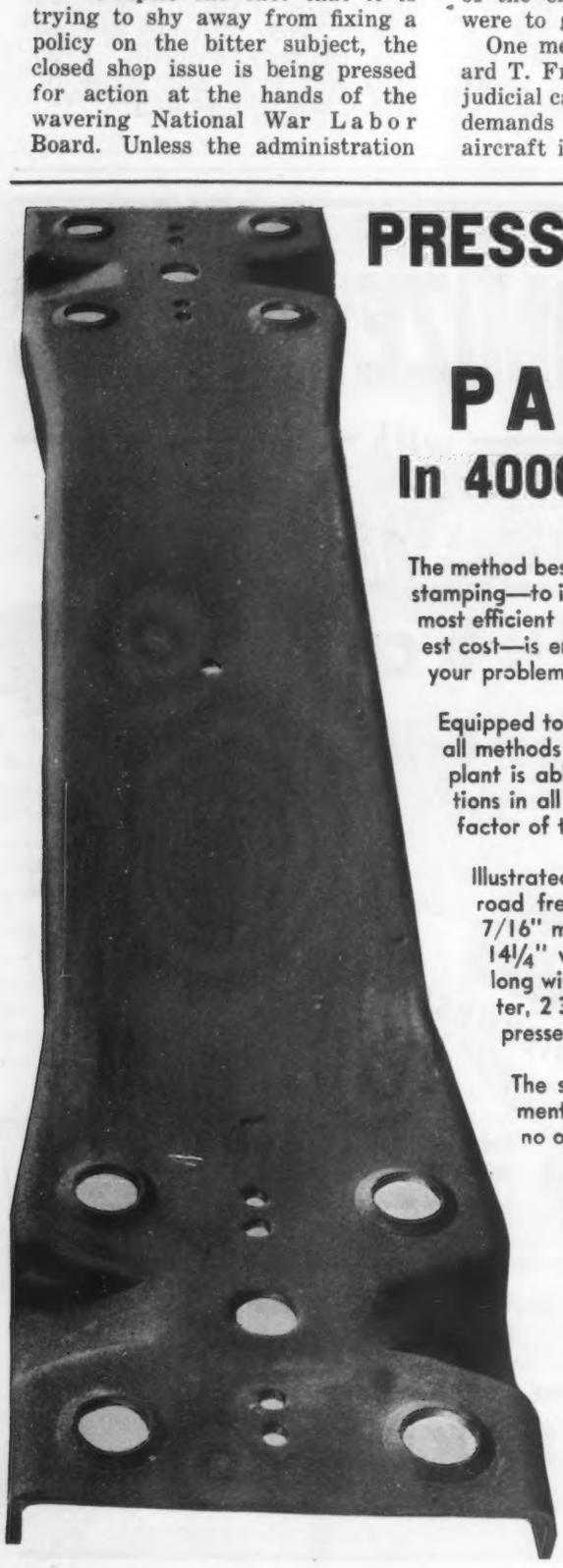
• • • **Despite the fact** that it is trying to shy away from fixing a policy on the bitter subject, the closed shop issue is being pressed for action at the hands of the wavering National War Labor Board. Unless the administration or Congress quickly takes the matter in charge, the board is going to have to come to taw on it in the Little Steel Case. The preliminary proceedings in the Little Steel Case, being pushed by SWOC, regardless of the effects on the war efforts, were to get under way Thursday.

One member of the panel, Richard T. Frankensteen, is to sit in a judicial capacity on a case involving demands that he is making in the aircraft industry as head of CIO's UAW. These demands in Little Steel embrace the closed shop, the checkoff and a $1 a day wage increase. Simultaneously SWOC is trying to clear the way for similar demands upon United States Steel Corp. But should the War Labor Board grant the demands for a closed shop it would undoubtedly set a precedent to cover not only all of the steel industry, and thereby nullify separate negotiations, but for industry generally. This is the point on which chief attention is focused even in the face of the importance attached to the $1 a day wage increase. It is doubted that SWOC itself really thinks it will get board approval for such an increase, though the general view is that it may get a portion of it.

Price Administrator Leon Henderson was one of the objects of an overall blast by SWOC President Philip Murray for Henderson's opposition to the $1 a day wage increase in steel, the Price Administrator contending it would have an inflationary effect. No doubt Mr. Henderson fears it would mean pressure for a rise in steel prices.

In answering the broadside by Murray that swept within its range the steel industry and government agencies and individuals, Chairman William H. Davis of the War Labor Board, to whom Murray's letter was addressed, said he held an open mind in the "Little Steel" case. That the board, however, is jittery over the closed shop issue was made evident in its decision last week which denied the union shop and a $1 a day wage increase to CIO employees of the Phelps Dodge Corp. It clearly indicated that it would like to see the "union security" (closed shop) policy fixed by some other government source. Its hope to avoid passing upon this ticklish issue was set forth by Davis who told Murray that he would not object if the problems of the board "were lightened by the formulation of a policy of some higher authority." The "higher authority" could be the President or Congress yet it is believed that the board itself will have to pass upon the question definitely in the "Little Steel" case.

It deferred the question in the Phelps Dodge case but SWOC is bearing down hard for a fixed policy in the steel case. The Phelps Dodge decision is not accepted as a precedent either as to the closed



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH
PRESSED STEEL CO.
READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California

PARISH Specialists in STAMPINGS of Distinction

shop or wage demands for ensuing proceedings, either in the steel or other cases where organized labor is represented by a single union or its demands are being made by a single union. The Phelps Dodge case involved demands of CIO's Mill and Smelter Workers Union, representing 700 workers at the Douglas, Ariz., plant of the company, while most of the other 6000 or 7000 workers at other company operations are engaged under AFL contracts. In turning down the CIO wage demand, the WLB said it did not wish to upset pay scales affecting a majority of Phelps Dodge employees and create "artificial competition" between two unions. It added that such a decision would be "a sorry reply to the pleas of our fighting men for equipment with which to defend their lives."

In the steel case the board is not confronted with a duality of organized labor pay scales, and therefore it will have to make a clear cut finding.

The board held back on the closed shop issue in these words:

"The question of additional union security should be deferred to later negotiations between the parties which may be undertaken in the event an authoritative national policy is enunciated respecting the matter."

In his blast Murray charged that "certain government and industry officials seemed determined to prevent the steel workers of this nation from making their maximum contribution to the war effort —through a strong, secure union and the minimum replenishment of seriously depleted living standards —by a premeditated publicity campaign." He turned his guns on Henderson, his assistant, J. R. Galbraith, Chairman William Leiserson of the National Labor Relations Board and the four steel companies making up the "Little Steel" case—Bethlehem, Republic, Youngstown Sheet & Tube and Inland. Leiserson was attacked because of his statement that if the steel case is decided on its merits the War Labor Board must necessarily fall and as a consequence the union shop question would inevitably go to Congress to be outlawed. The statements by steel companies against the closed shop were attacked by Murray whose attitude he charged "smacks of a conspiracy." While disclaiming that he was associating Davis personally with "these strange developments," Murray took an oblique swing at the WLB when he said that "on the basis of a newspaper report, supposedly emanating from the War Labor Board, we find the four steel companies involved in this case, issuing virtual edicts on the union shop issue." The newspaper report, Murray declared, hinted at a compromise in the steel case on "union security." He hotly assured Davis that if such a thing is contemplated the "SWOC is no party to it."

Davis told Murray that Henderson's appearance before the WLB had been planned before it had received the steel case, that Henderson's remarks were factual and comprehensive but that his position was not such that his views "must rule the action of the board." Leiserson's speech, Davis said, "had no planned relation" to the steel case.

Uninterrupted war-time production demands the positive, unfailing operation of Lever-Seald Homestead Valves. Thanks to their powerful lever and screw principle, and the exclusive "controlled-lift" feature, Lever-Seald Valves cannot "stick" or "seize," even under the toughest service conditions. Use them on high pressure or high temperature hydraulic-stop service, and you get quick, quarter-turn opening or closing, and a positive seal *without lubrication.* Straight line flow for minimum pressure drop, and protected seating surfaces for long life, are added values which assure the user of continuous trouble-free service for "the duration." Specify Homestead Lever-Seald Valves on your next valve job.

HOMESTEAD VALVE MFG. CO.
P. O. BOX 23, CORAOPOLIS, PA.

HOMESTEAD VALVES

Send for Valve Reference Book No. 38 and for special low prices on your quantity valve needs.

Beehive Price Ceiling Forces A Few Ovens to Withdraw

Pittsburgh

• • • **So far most** beehive furnace coke operators in the Connellsville region have run into no undue hardships as the result of the $6 a ton ceiling which forced some of them to reduce their prices 25c. a ton from what they had been charging. Some marginal ovens, however, have had to be withdrawn from production since coal hauling costs from the mine to the oven were too great to operate under the new ceiling.

The real test on the effect of the ceiling price on coke production will come in the second quarter when a drop in furnace coke production is probable. Some operators are completing first quarter contracts even though they are only breaking even on some of them. When new commitments are made for second quarter deliveries, some operators may be forced to eliminate those supplies on which they are either losing money or on which no profit is being made. The crux of the question lies with coal mining costs. Some operators are getting less coal from their mines which affects both operation and costs of the beehive ovens. Scarcity of labor, the hiring of new men because of miners being drafted, and the general slowing down of production with mediocre help has caused loss of efficiency and increased cost in mining operations.

Within 30 or 60 days some coke operators will have to go far afield for coal as present veins are worked out (THE IRON AGE, Jan. 29, 1942, p. 80). Whether they can do this under the present ceiling is problematical. If they can't, production may be stopped unless relief is granted from OPA. It is estimated the number of ovens which have ceased operation because of the ceiling price on beehive coke is small compared to the total but at the same time, even the loss of 2000 tons of coke a month is considered serious in view of the quick tightening of supplies in the last few weeks and the importance of beehive furnace coke in the success of blast furnace expansion programs.

Export Price Procedure

• • • **Latin American trade** will be protected from extortionary price policies according to executives at the Board of Economic Warfare and the Department of Commerce. The Board has issued Current Controls Bulletin No. 7 which outlines the following policy and procedure with respect to export prices and appeals:

(A) Prices quoted on materials for export should not be in excess of existing provisions in the export price schedules fixed by the OPA.

(B) Where prices are not con-

ARE YOU LOOKING FOR A *Substitute* FOR

COPPER ★ ALUMINUM ★ BRASS STAINLESS STEEL NICKEL ★ GALVANIZED STEEL ? ? ?

Try porcelain enamel!

ING-RICH Porcelain Enamel is an inorganic finish that provides extremely hard, easy-to-clean surface. We fuse it into the very pores of your base metal—either steel or cast iron—at extremely high temperatures. Durable. Economical. Also available in acid-resisting finish. Where rust resistance is primary requirement, only ground coat is necessary and can be applied in your choice of several colors—black, blue, green, etc. Two large ING-RICH plants equipped to enamel wide range of industrial and consumer materials. Seasoned engineers to show you how to use Porcelain Enamel in your production. Write, wire, or phone our nearest plant.

Ingram-Richardson Mfg. Co., of Ind., Inc., Frankfort, Ind.
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

INGRAM-RICHARDSON
Porcelain Enamel

Additional Copies of Price Section on Hand

• • • Extra copies of the price section which appeared in THE IRON AGE Feb. 12 may be obtained from the Reader Service Department of this magazine, 100 E. 42nd Street, New York, on the following basis: 25c. each for 1 to 10; 20c. for 11 to 100; 18c. for 101 to 300, and 15c. each for larger quantities.

trolled by such schedules, prices quoted should not be unreasonable in relation to current market quotations for export.

When a quoted price is above existing export ceiling provisions, application for license will be rejected, and the applicant's recourse under existing regulations is by appeal procedures established by OPA.

When a quoted price, uncontrolled by an OPA schedule and not accompanied by an explanatory statement may seem unreasonable to this office, the applications for export licenses may be rejected. In such case, the exporter has the right to appeal to the Office of Export Control.

↓ ↓

Radio Boosts Criticized

• • • Immediate cancellation of all substantial increases in wholesale and retail prices of radio receiving sets and radio phonographs was requested by Price Administrator Henderson in a sharply-worded telegram directed to all wholesale and retail outlets. The price advances, which followed official indication by the WPB that most civilian radio production would be discontinued, were characterized as "inflationary and unfair because maximum manufacturers' prices were set by this office on Feb. 9."

↓ ↓

Profiteers Persist

• • • Despite the provisions of Price Schedule 49 (resale of steel) which is now backed up by the price control law, many cash-on-the-barrel transactions in steel at excessively high prices are reported being made in the East.

Reports of galvanized sheets being sold at around 8c. per lb. have been heard recently. No records are kept of the transactions. Leading warehouses and mills are not in any way connected with these transactions.

The fact that the steel is available at all might prove surprising in view of all the recent talk about scarcity of steel, but the fact is that stocks of so-called distressed steel are heavy for a variety of reasons.

In many cases factories are unable to use the steel because of inability to obtain vital parts needed for the particular manufactured product. In other instances, output has been limited or prohibited

Quick Economical Solutions to Many Design and Production Problems
SPRINGS
STAMPINGS
WIRE FORMS
What type of Spring, Small Stamping, or Wire Form is most suitable? What is the best kind of material to make it out of? How can it be applied to your product to best advantage?
Whatever your problem may be, call on Hubbard for information and recommendations on the many types and uses of Parts Like These.
M·D·HUBBARD SPRING COMPANY
331 Central Ave. • Pontiac, Mich.

entirely by governmental orders, thus creating stranded stocks. In a few cases, steel is obtained by qualified buyers and deliberately resold with a view toward profiting upon subsequent sales through a split-up between the original buyer and the reseller. The difficulty of enforcing the price order against such violations is tremendous.

Copper Scrap Deliveries

• • • **The copper and** copper alloy scrap price schedule (No. 20) has been amended further to exempt deliveries completed prior to March 15 of any copper alloy scrap which was contracted for in writing before Feb. 6, provided certified copies of the contracts are given OPA by the consumer.

The amendment is No. 4. Amendment 3 was issued on Feb. 5, effective Feb. 27. Several buyers and sellers found they could not complete shipments prior to Feb. 27. The question of whether soft red brass borings includes all red brass borings regardless of their tin content has been clarified by OPA, which is considering the proper price for red brass borings with a tin content of more than 6 per cent. These borings are not included in the category "soft red brass borings," which only includes borings or turnings from castings falling in the category "soft red brass" and not from red brass with a higher tin content.

A "First Consideration" IN TIME OF WAR

● Jessop WASHINGTON contains no tungsten, nickel, chromium, or other strategic alloys—therefore, deserves first consideration for tool and die applications while the nation is at war. Since carbon is the only alloying element present, the production of WASHINGTON is entirely independent of foreign sources of supply.

Unless an alloy steel is necessary, you can help conserve our imported alloys—and at the same time reduce your tool steel costs—by specifying Jessop WASHINGTON water hardening tool steels for your tool and die applications. WASHINGTON is our highest quality carbon tool steel and is very carefully processed to insure maximum productivity. Send for our descriptive Bulletin 142.

JESSOP STEEL COMPANY
General Offices and Works
WASHINGTON, PENNA., U. S. A.

JESSOP STEELS FOR AMERICA AND HER ALLIES

CARBON · HIGH SPEED · SPECIAL ALLOY · STAINLESS · COMPOSITE STEELS

Chemical Speculation Eases

• • • **The highly speculative** situation in chemicals prices which prevailed for some time in markets of the East and other sections of the nation has eased due to a combination of events. The establishment of quota systems, as in acetone, has curbed the tendency toward excessive inventories; applications for export licenses have been scrutinized more carefully from the price angle, and the Far East war situation has had a definite reaction.

Small Lots of Chrome Ore

• • • **Agreement was reached** at Washington last week whereby amounts of chrome ore as small as 1000 lb. will be considered acceptable commercial units. Heretofore chrome has been traded on a carload basis. The aim is to stimulate production from small domestic chrome properties.

Profit Rules Shunned

• • • **According to word** from Washington last week OPA has declined to lay down specific rules as to what constitutes a fair profit for individual companies, and does not propose to establish criterions on profits which will apply to all industry. Cases involving volume shrinkage after the establishment of profit margins are expected to be scrutinized closely, with no indication that relief must be permitted.

Railroad Program Falls Short of Goal

• • • **Despite** the help of allocations and preference ratings, the freight car building program, which was set up as 9000 cars for January and 36,000 during the following three months of this year, is expected to fall short of the original goal. As indicated in THE IRON AGE previously, this total of 45,000 freight cars is not expected to be completed before some time in June instead of May 1.

January production of freight cars in contract shops amounted to 6150 and with cars made at railroad car shops estimated at 1500, the total of 7650 fell short of the estimated 9000.

Shortage of certain structural shapes, specialties, and material other than plates is believed to be part of the reason for the failure to make the grade. As the freight program lags, however, it is expected to be further hampered by the injection of heavy shell steel requirements and probable increased Lend-Lease aid, both of which are fulfilled on allocations.

The temporary holdup in the production of certain Lend-Lease material for Great Britain, will give a breathing spell to American mills but at the same time this tonnage, which has amounted to approximately 350,000 tons a month, most of which is semi-finished, will be diverted to the American war effort. One exception to the holdup is believed to be orders involving certain semi-finished material.

Even though the WPB allocated more than 500,000 tons of rails to the railroads for the first quarter of this year, complaint has already been made that this tonnage has been cut in half, presumably because of direct war requirements.

THE IRON AGE and steel officials months ago warned specifically that if certain railroad requirements were not promptly ascertained at that time they would run head on into the war effort later on.

COMING EVENTS

March 4—American Society for Testing Materials, Cleveland.
March 26 to 28—American Society of Tool Engineers, annual meeting, Hotel Jefferson, St. Louis.
April 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York.
April 15 to 17—Open Hearth Conference, Cincinnati.
April 15 to 18—The Electrochemical Society, spring convention, Nashville, Tenn.
April 18 to 24—Foundry and Allied Industries Show, Cleveland.
April 20 to 24—American Foundrymen's Association, Cleveland.
April 27 to May 1—American Mining Congress, Coal Show, Cincinnati.
May 11 to 13—American Gear Manufacturers Association. 26th annual convention, Hershey, Pa.
May 25 to 28—National Association of Purchasing Agents Convention, Waldorf-Astoria Hotel, New York.
June 21 to 25—American Water Works Association, Chicago.
Aug. 23 to 30—National Association of Power Engineers, New Orleans.
Sept. 1 to 11—Building and Construction Trades Council, Atlantic City, N. J.
Sept. 22 to 24—Association of Iron and Steel Engineers, Pittsburgh.
Oct. 5 to 9—National Safety Congress Association, International convention, Baltimore.
Oct. 12 to 16—National Metal Congress and Exposition, Detroit.

Improved finish
is obtained with this GARDNER *Wet* GRINDER!

ON many flat surface jobs — particularly on steel parts — an improved finish is produced when the work is ground wet.

The Gardner No. 223 — 23" machine shown here, carries special hoods which completely enclose the work-table top and fixtures during the grinding operation, thus confining the spray to the greatest degree possible on a tool of this type.

The particular job being handled here, is tool bits, ground one surface at a time. Not only is an excellent finish produced, but a good degree of accuracy is insured by this method.

For moderate production on many flat surfacing jobs, a Gardner Hand-Operated Single Spindle Grinder — WET or DRY — is the ideal tool.

Write for YOUR copy of BULLETIN 200B

GARDNER MACHINE COMPANY
412 East Gardner Street, Beloit, Wisconsin, U. S. A.

Priority Loopholes Being Plugged; War Needs at 43,000,000 Tons

• • • **Amid considerable** creaking and groaning, the priority system is currently undergoing a broad tightening up that is slowly but effectively choking off all loopholes through which strategic material has been seeping into unessential civilian uses. At the same time, more attention is being paid to what is termed essential civilian uses. Thus far there has been no definition of this term that could guide industry, but rather decisions have been made on the merits of each individual case. It is believed, however, that some clarification of this classification will be needed shortly to avoid considerable confusion and unnecessary competition for important materials.

Typical of the general tightening up of the priority system is the court action taken by WPB recently to force a company accused of violating priority regulations to permit WPB officials to inspect the company's books. Thus far the petition has not been acted upon and it is possible that the matter will be settled out of court.

Regardless of good intentions, there is unmistakable evidence that essential civilian requirements and even certain indirect defense and war needs carrying such ratings as A-3 to A-5 will be shunted so far behind in deliveries within the next month or two that some new type of action must be taken if these orders are to be completed.

Private and responsible estimates of war needs reaching THE IRON AGE indicate the possibility that more than 43,000,000 tons of steel ingots will be earmarked this year for such direct war needs as ship building, shell steel, tanks, lend lease and railroads.

TRADE AUTOMATIC MARK

Manufacturers for Over Thirty Years

MODERN Electric Propelled INDUSTRIAL TRUCKS

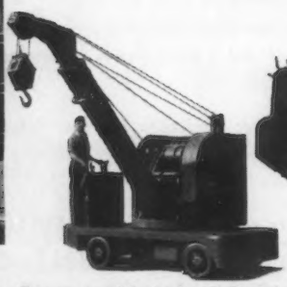
FOR ECONOMICAL MATERIALS HANDLING

- FORK AND RAM TRUCKS
- LOW AND HIGH LIFT TRUCKS
- COIL AND SHEET HANDLERS
- LOAD CARRIERS
- TRACTORS — CRANES

Capacities 1000 to 60,000 lbs.

Low Lift Skid Platform Type

Fork and Ram Trucks
Telescopic and Non-Telescopic for Pallet and Coil Handling



Cranes — Motorized Slewing Type—Four Motor Control for Individual and Simultaneous Operation

High Lift Skid Platform Type

Light Duty Fork Trucks

Die Handlers Heavy Duty Type with motorized die and unloading platform

Coil and Sheet Handlers

REQUEST DETAILS AND LITERATURE

Listed Under Reexamination Service of UNDERWRITERS' LABORATORIES

AUTOMATIC TRANSPORTATION CO.
Div. of the Yale & Towne Mfg. Co.
75 W. 87th St. CHICAGO, ILL.

WPB Explains PD-1a Use; Permits Facsimile Signature

• • • **Applicants for** priority assistance who use form PD-1a have been warned by WPB that applications cannot be considered unless they are properly signed at the bottom of the first page of the copy marked "duplicate," and not in the space marked "certification" on the back of the sheet.

At the same time, WPB announced that in order to relieve companies which find it necessary to assign or extend a large number of preference ratings by endorsement on purchase orders from the necessity of having each one manually signed by a responsible official, Priorities Regulation No. 7, issued Feb. 17 by WPB, allows the use of a facsimile signature. Use of a facsimile signature is subject to a number of specified conditions, and a written record of each use must be kept for at least two years.

Some confusion has arisen con-

cerning form PD-1a because the general instructions which accompany the form instruct applicants to "execute the certification on the duplicate copy." The reverse side of the "duplicate" sheet contains a form of certification which is to be used in endorsements on purchase orders of applicants to whom a rating has been assigned on the PD-1a form. Many applicants have been signing this sample certification instead of signing their applications in the proper place on the front side of this sheet.

Applications should be signed in the space immediately below the paragraph beginning: "The undersigned hereby certified that he is authorized to execute this application. . . ."

WPB has also clarified the proper use of a PD-1a form to apply for a preference rating on capital equipment. This form may be used provided that any resulting expansion of productive capacity does not involve the renovation of old or the construction of new buildings. When such renovation or construction is involved, an application for a project rating should be made on forms PD-200 and PD-200a.

Forms PD-200 and 200a do not at present permit the inclusion of an application for a preference rating on machine tools required for the project. Pending revision of the form, applicants who need machine tools in connection with a project for which a PD-200 application form is submitted should attach a supplemental statement in quintuplicate containing the applicant's name and address and a full explanation of his machine tool requirements.

↓ ↓

Bullet Core Steel Restricted

• • • **A complete** allocation system for shot and bullet core steel has been set up in priority order M-21-f, issued by WPB. The order applies to steel for 20, 37, 40, 57 and 75 mm. and 3-in. armor piercing and semi-armor piercing shot, and to .30 and .50 cal. bullet cores. It provides that starting March 1 no deliveries of shot and bullet core steel shall be made except on an allocation order.

Weekly reports must be made to the War Production Board and the Army and Navy Munitions Board by producers on form PD-307. Purchasers are required to make monthly reports on Form PD-308.

Purpose of the order is to stop over-buying and to reduce excessive inventories of this special type of steel, which calls for unusual hardening and extra time in its manufacture. Under the order, a more effective and regular flow of the metal will be possible.

It is effective immediately.

↓ ↓

Graphite Flake Allocated

• • • **Madagascar flake** graphite can be used only for the manufacture of crucibles for the war effort, according to the terms of or-

So-o-o Chlorinated Solvents are Short!

TWO VARIATIONS

Magnus Emulso-Dip and Magnus Emulso-Spray are two variations of the same new method.

•

Either can be used in many instances on existing metal washing machines with little alteration.

•

On many jobs, washing machines are not necessary. You can set up the necessary tanks and sprays yourself.

•

Where volume and the nature of the job make a new washing machine necessary, we will design Magnus Emulso-Dip or Emulso-Spray Washing Machines to meet your problems.

Here's an Unrestricted Material That Cleans by a Better Method!

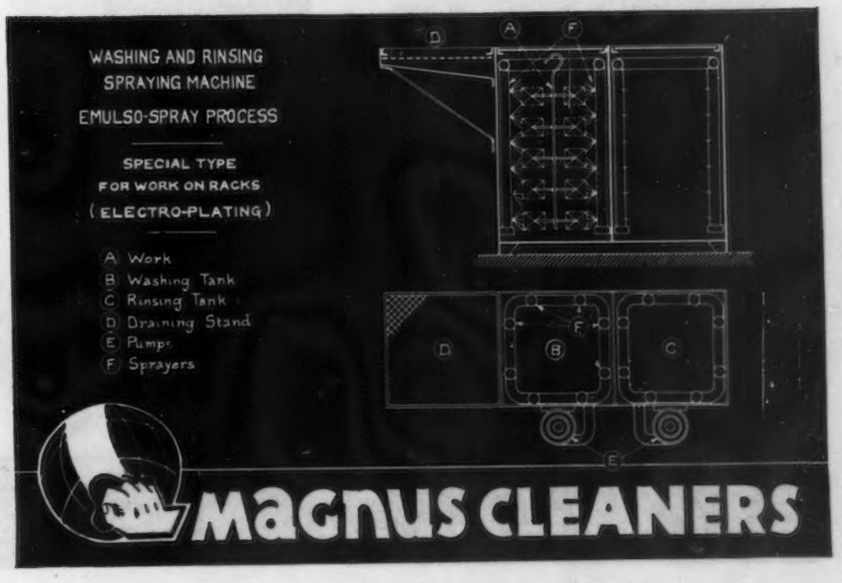
The Magnus Emulso-Cleaning Method replaces solvent or vapor degreasing. It actually costs less to do a better, quicker, more dependable job, even on smut and difficult dirts on which other methods fail.

This method has been successfully used for many months in defense plants all over the country.

It is applicable to *all* types of metal cleaning and can be used *without* heat on many operations.

If you are interested in sure-fire metal cleaning to insure steady, speeded-up production in the months ahead, write to us *now* for full details.

MAGNUS CHEMICAL CO., 46 South Avenue, Garwood, N. J.



der M-61 issued Feb. 14 by WPB. The order provides that effective upon issuance, Madagascar flake graphite of crucible grade cannot be used for any purpose other than crucibles, and after Feb. 23, 1942, crucibles cannot be made of this material except upon specific authorization. The order is not retroactive in this regard and manufacture started before the effective date can be completed.

Manufacturers must apply monthly on forms PD-303a and 303b for specific authorization to make crucibles and suppliers to make deliveries which the manufacturer is authorized to receive. Army, Navy and other Governmental contracts are exempted from the restrictive provisions of the order.

THE TOUGHEST BENDING MADE EASY!

Talk about streamlined action! With a Buffalo Bending Roll one man can rapidly and accurately form arcs, circles, spirals and other circular forms with a minimum of manual operations. This versatile machine saves valuable time on every bending job, even the most difficult—keeps output up with production schedules. Easy to operate, even for unskilled labor. Several models. New Bulletin on request.

BUFFALO FORGE COMPANY

492 Broadway, Buffalo, N. Y.

CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONT.

"Buffalo" Bending Rolls

New Aluminum Order

• • • **WPB last** week centered all allocation control over aluminum in one order, M-1-f. Previously aluminum allocation was covered by orders M-1 and M-1-a. These latter orders are superseded by the new order M-1-f. The new order leaves allocation control in substantially the same form in which it has been administered in the recent past.

Suspension Order Amended

• • • **Suspension order** S-11, issued against the Hurley Machine Division of the Electric Household Utilities Corp., Chicago, has been amended to permit the company to make deliveries of spare parts required for repairs to its electric washing machines and electric ironing machines, now in the hands of its customers, WPB has announced.

Plane Ratings Raised

• • • **WPB Chairman** Donald Nelson last week ordered all ratings on every type of airplane and airplane components raised to A-1-a. Formerly the Army and Navy had though adequate an A-1-b rating for bombers and A-1-d rating for pursuit ships with A-1-d assigned to airframes and A-1-c given to engines and propellers.

Instrument Output Cut

• • • **Sharp curtailment** of the use of critical materials in the manufacture of all types of musical instruments has been ordered by WPB. All musical instruments, except radios, phonographs, radiophongraphs and articles designed primarily as toys, are covered by the program, which is set forth in general limitation order L-37.

Extent of the curtailment is based on the total amount of critical materials, by weight, contained in various types of instruments. The materials involved are iron, steel, magnesium, aluminum, nickel, chromium, rubber, copper and copper-base alloys, tin, lead,

zinc, phenol formaldehyde plastics, neoprene and cork.

↓ ↓

Order P-98 Revised

• • • **Operators of** petroleum enterprises are relieved of the necessity of obtaining a countersignature from field representatives of the Office of Petroleum Coordinator when using preference ratings of A-8 or lower to obtain repair, maintenance and operating supplies with a value of less than $500 by Amendment No. 1 to order P-98, announced Saturday by WPB.

↓ ↓

• • • **Prime worry** in Pittsburgh steel circles, following the promulgation of the can order is the pecular status of uncoated black plate which may be used in unlimited quantities for the manufacture of cans. Several steel companies have already warned their customers that they cannot accept changeovers in orders from tin plate to black plate for the reason that they can give no definite delivery data on black plate not having preference ratings.

Some authorities are expressing the belief that the government should clarify the priority status of not only tin plate but should also make some definite commitment with regard to black plate since the latter will be called upon to take the place of containers in many cases where tin plate is unavailable.

WPB Quotas May Not Be Sold or Traded

Washington

• • • Manufacturers whose production has been limited by a WPB order cannot increase their production by buying or otherwise obtaining the right to use the quota which has been assigned to another manufacturer in the same field without receiving express permission of the WPB, the Division of Industry Operations has explained.

When a company operating according to a quota set by a limitation order, is sold outright or ownership of the entire business is otherwise transferred, the new owner may continue to operate under the quota if he continues to make the same product at the same plant with substantially the same personnel other than executive officers.

↓ ↓

Aircraft Rating Changed

• • • **Action was taken** by WPB last week to formalize the verbal announcement made earlier giving an A-1-a preference rating to material entering into the production of direct military aircraft products. Preference rating order No. P-109 was issued to replace 12 orders that previously applied to the aircraft industry. Products covered in the P-109 order include aircraft, air-

The DURABLE Black Finish for STEEL

For DEFENSE and NON-DEFENSE

Non-defense and semi-defense items such as ring binders, bicycles, washing machines and thousands of others find Pentrate readily accepted by the consumer.

This **attractive** and **protective BLACK** finish actually **penetrates** into the steel. Pentrate is specified on millions of defense items including steel propellor blades and hubs, other important aircraft and automotive parts, rifles, machine-guns, side arms, anti-aircraft parts, clothing hardware and many other items. The **simplicity** and **economy** of this low temperature process make it a natural for speeding up production lines.

Pentrate is **widely** used on gauges, bearings and precision instruments for **increased performance** and **protection.** Remember there is **positively no size change** and nothing to chip crack, craze, peel or rub off.

We will gladly Pentrate samples of your product and return them promptly without charge.

Our FREE 18 page Pentrate booklet explains the process and describes equipment necessary — send for it today.

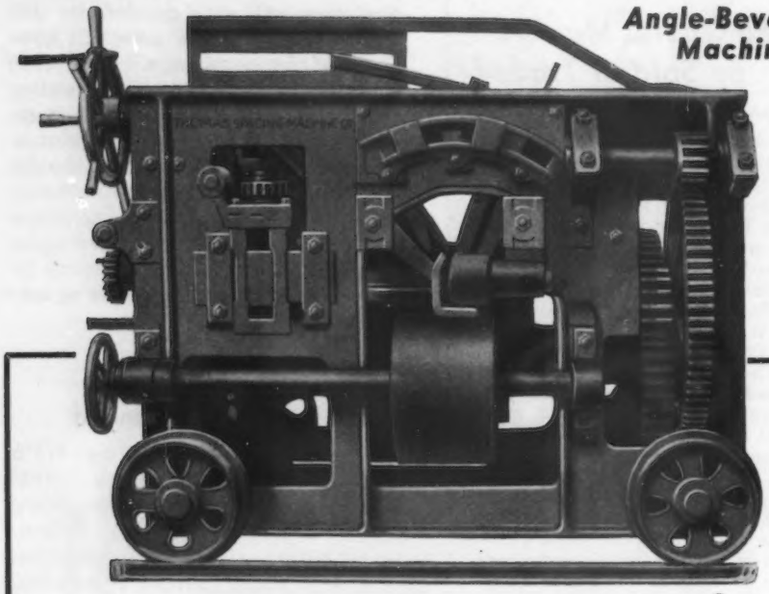
Pentrate material shipped immediately from stock. No waiting — No priorities necessary.

PHYTANIUM BLENDED
PENTRATE
PATENTED
ATTRACTIVE BLACK APPEARANCE
NO SIZE CHANGE
ACTUAL PENETRATION
CORROSION RESISTANT
FRICTION REDUCING

HEATBATH CORPORATION
SPRINGFIELD, MASSACHUSETTS, U. S. A.

For the Ship-builder—

Angle-Beveling Machine



Ask for Bulletin 102

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

SAVE
YOUR CUTTING TOOLS
WHILE USING THEM!

Save the cutting tools you're using by prolonging their useful life. This will help to compensate for some of the tools you can't get, even though you have money in the bank.

And saving your cutting tools while using them needs a dependable supply of coolant. In these days of 24-hour operation, manufacturers are using more Ruthman Gusher Coolant Pumps than ever before.

Gusher Pumps are designed for continuous operation—Scarcely a production shop carries a spare part for Ruthman Pumps—That means they are built right from the start.

The RUTHMAN Machinery Company
CINCINNATI
OHIO

craft engines and propellers, with delivery schedules approved by the Joint Aircraft Committee. Also covered are components of aircraft, including airframes, armament, accessories, instruments, equipment, etc., and spare parts. The orders replaced by P-109 are P-3, P-4, P-9-a to P-9-g, P-13, P-15 and P-52.

↓ ↓

Discuss Plumbers' Goods

• • • **A simplification program** for all types of plumber's brass goods has been adopted as a result of an industry meeting last week with Walter W. Timmis, Chief of WPB's Plumbing and Heating Branch. He told representatives of 12 leading manufacturers that the shortage of critical materials would not permit production of a sufficient amount of brass goods to supply both the government's war needs and ordinary civilian requirements.

All Navy Department and War Department contracts hereafter will specify the types of equipment provided for under the simplification program.

↓ ↓

Tractor Sales Halted

• • • **WPB has** issued an order prohibiting the sale or delivery of unused track-laying tractors and certain auxiliary equipment in the possession of manufacturers, distributors and dealers. Equipment covered by the order, L-53, effective as of 9:00 a. m. Feb. 19, included bulldozers, angledozers, power control units and winches to be mounted on unused track-laying tractors. An exception was made in the case of persons whose orders have been assigned a preference rating higher than A-2.

↓ ↓

PD-25c and 25d Withdrawn

• • • **Withdrawal of** priority Forms PD-25c and PD-25d, relating to the customers certificate of requirements, under the old Defense Supplies Rating Plan (order P-6), which was superseded by the Production Requirements Plan (order P-90), was confirmed last Friday by the WPB Division of In-

dustry Operations (see THE IRON AGE, Nov. 27, 1941, page 90).

Use of Forms PD-25c and PD-25d is no longer necessary since the Defense Supplies Rating Plan has been superseded and most preference ratings are extendable. Use of Form PD-25d is to be discontinued immediately, and no report should be submitted on Form PD-25c for any month later than January, 1942.

↓ ↓

Tin Can Order Modified

• • • **Special product** and nonessential cans which had been completely assembled on or before Feb. 11 may be sold, according to a telegraphic order sent last Friday to can manufacturers by WPB.

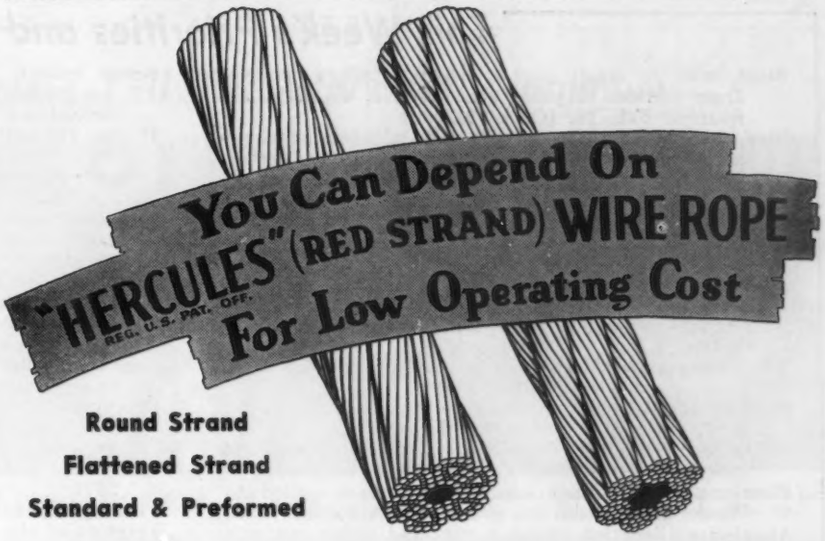
The board suspended until April 30 the restrictions imposed by Section C (4) of General Preference Order M-81 on tinplate and terneplate in so far as they pertain to can material and sizes for the following purposes: To permit sale and delivery of tinplate or terneplate cans which were completely manufactured before Feb. 11; to permit the assembly, sale, and delivery of cans, all the component parts of which were cut or lithographed by Feb. 11, and to permit canners to buy cans which may be delivered pursuant to the above regulations.

These exceptions do not apply to beer, motor oil, or coffee cans, or to cans for packing products which are processed or sterilized by heating within a sealed can.

Federal Government Urged To Amend Specifications

New York

• • • **According to** recommendations to WPB by the Engineers' Defense Board of New York last week, Federal specifications should be amended to provide that where Federal construction includes the use in temporary construction of such materials as sheet steel piling, framing, bracing, forms, etc., which may be reclaimable but which are not normally reclaimed because of the cost of reclamation exceeding the salvage value, such materials should be reclaimed for either re-use or salvage as scrap.



WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** Established 1857
5909 Kennerly Avenue, St. Louis, Mo.
New York • Chicago • Denver • San Francisco • Seattle • Portland

SPRINGS *from* Holly

FOR EVERY MECHANICAL NEED

COIL SPRINGS FLAT SPRINGS LOCK SPRINGS
SPECIAL SPRINGS WIRE SPECIALTIES
SNAP RINGS WIRE FORMS

We make springs from every type of wire up to and including three-eighths diameter. We pledge rigid adherence to your specification. Get our quotation on your next job.

AMERICAN SPRING
AND MANUFACTURING CORP.
Holly, Michigan

This Week's Priorities and Prices

Steel sales in small quantities by retailers removed from control of price schedule No. 49, OPA announced Feb. 18. (OPA-PM2509)

Tire owners who are not retailers, distributers or wholesalers may transfer tires from one to another of their own vehicles or to a public warehouse, according to amendment No. 7 to order M-15-c. (OPA-PM2504)

Auto graveyards to be surveyed to ascertain potential supplies from this source. (WPB-245)

Radio set price increases recently announced should be cancelled, OPA says. (OPA-PM2518)

Radiosondes priority order P-38 extended to April 30, 1942.

Temporary warehouses may be erected to store lend-lease materials. (WPB-262)

Musical instrument manufacture curtailed by order L-37, effective Feb. 18. (WPB-264)

PD-1a forms being improperly signed, WPB warns, and described proper method of signing. (WPB-269)

Plumbing and heating equipment makers called to Washington to discuss prices. (OPA-PM2506)

Aluminum allocation program centered under one new order M-1-f, in place of M-1 and M-1-a which previously contained control regulations. (WPB-247)

Bullet core steel allocation system established in order M-21-f issued Feb. 17. (WPB-248)

Tung oil preference order extended to April 15, 1942. (WPB-249)

Graphite flake use restricted to war purposes only in order M-61 issued Feb. 17. (WPB-250)

Retail sales of mechanical refrigerators may be made only from stocks on hand at 10 a. m. Feb. 14, WPB rules. (WPB-251)

Light plane sales limited to certain purchasers and amount of aluminum which may be used restricted in order L-48 issued Feb. 17. (WPB-252)

Petroleum price schedule No. 88 amended with respect to certain reporting requirements. (OPA-PM2519)

Copper scrap sales under contracts signed prior to Feb. 6 may be delivered against until March 15, according to amendment No. 4 to price schedule No. 20. (OPA-PM2522)

Iron and steel branch of WPB reorganized in order to place in charge of each unit a man who is an expert in that field. (WPB-277)

Copper and brass order M-9-a applies only to metal warehouses and does not restrict deliveries of completed copper products to the ultimate consumer, WPB announces. (WPB-282)

Scrap rubber in limited amount made available for use in less essential civilian articles, according to amendment No. 4 to order M-15-b. (WPB-284)

Quotas for output set under limitation orders may not be sold or traded, but they may be assigned under certain conditions and upon authorization of WPB. (WPB-256)

Facsimile signatures permitted in assigning or extendnig priority ratings, under certain conditions, according to Priority Regulation No. 7 issued Feb. 17. (WPB-257)

Suspension order S-11 against Hurley Machine division of Electric Household Utilities Corp. modified to permit deliveries of spare parts. (WPB-263)

Coal tar product producers meet in Washington to discuss price stabilization with OPA. (OPA-PM2502)

Relaying rail price schedule No. 46 amended, effective Feb. 6, substituting Duluth, Minn., for Minneapolis as a basing point. (OPA-PM2503)

Cellophane order L-20 extended to March 15. (WPB-237)

Flashlight industry committee formed. (WPB-241)

Tractors of the track-laying type, which are not being used, and certain auxiliary equipment may not be sold or delivered without WPB authorization, according to order L-53 issued Feb. 19. (WPB-289)

Aircraft products formally rated A-1-a in order P-109, issued Feb. 20. This order supersedes P-3, P-4, P-9-a to P-9-g, P-13, P-15, and P-52. (WPB-294)

Petroleum plant operators relieved of necessity of obtaining countersignature from field representative of OPC when buying material valued at less than $500 in amendment to order P-98 issued Feb. 20. (WPB-301)

Manila fiber processing further curtailed in amendment No. 3 to order M-36 issued Feb. 20. (WPB-303). Agave fibre and cordage and twine placed under allocation system in order M-84 issued Feb. 20. (WPB-305)

Forms PD-25c and PD-25d withdrawn from use by WPB. (WPB-292)

Tinplate order M-81 amended to permit sale of certain special product and non-essential cans which had been assembled before Feb. 11. (WPB-299)

• • •

For copies of above announcements address Division of Information, O.E.M., giving announcement number as shown in parentheses after each paragraph. (For example, WPB:300 *means announcement* 300 *issued by the War Production Board.*)

Revisions for The Iron Age Priorities Guide

• • • Following revisions are to be made to THE IRON AGE Priorities and Allocation Guide published with the issue of Jan. 29. These should be suitably cross indexed.

Under "M Orders," page 8, add:

M-1-f—Directs distribution of aluminum. *Supersedes M-1* and *M-1-a.* (2-17-42)

M-15-e—Permits car and truck owners to transfer tires from one vehicle to another, or to store in a warehouse. Does not cover retailers or wholesalers. (2-16-42)

M-15-b—Amendment No. 4. Makes limited supplies of scrap rubber available for less essential civilian articles. (2-19-42)

M-21-b—Allocates shot and bullet core steel. (2-17-42). Related forms: PD-201, 307, 308.

M-36—Amendment No. 3. Further curtails processing of Manila fiber. (2-20-42)

M-47—Amendment No. 3. Permits burlap bag use for certain agricultural purposes. (2-16-42)

M-61—Allocates Madagascar flake graphite; restricts output of crucibles. (2-17-42). Related forms: PD-303A, 303B.

M-68—Amendment No. 3. Clarifies well-spacing provisions. (2-18-42)

M-84—Curtails use of Agave fiber, cordage and twine. (2-20-42)

Under "P Orders," page 4, add:

P-38—Amendment No. 1. Eliminates clause limiting use of rating only for material on the priorities Critical List. (2-18-42)

P-57—Amendment No. 2. Redefines term "light trucks." (2-12-42)

P-98—Amendment No. 1. Relaxes certain signature requirements on orders of less than $500. (2-20-42)

P-109—Rating of A-1-a assigned to material for aircraft parts. *Supersedes P-3, P-4, P-9-a to P-9-g, P-13, P-15 and P-52.* (2-20-42)

Under "L Orders," page 7, add:

L-5-b—Interpretation No. 1. Clarifies deadline. (2-16-42)

L-20—Amendment No. 2. Extends order to March 17, 1942. (2-14-42)

L-37—Restricts production of musical instruments. (2-17-42)

L-48—Restricts sales of planes of less than 500 hp.; also limits aluminum use in such planes. (2-17-42)

L-53—Restricts sales of unused track-laying tractors and certain auxiliary equipment. (2-19-42)

Under "S Orders," page 7, add:

S-11—Amendment No. 1. Permits delivery of certain repair parts. (2-16-42)

Under "Miscellaneous Orders," page 7, add:

Priorities Regulation No. 7—Permits use of facsimile signature for assigning or extending orders, subject to certain conditions. (2-17-42)

Professional Actors Tell The Story Of Aluminum

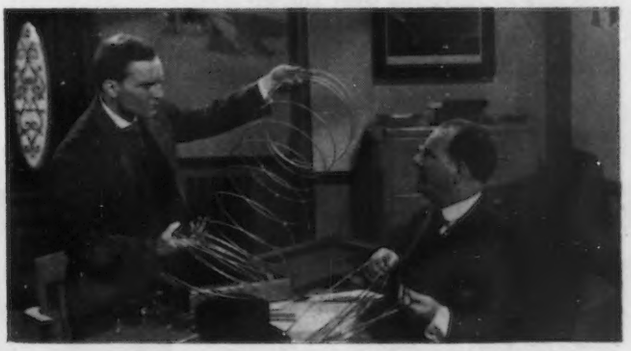
• • • A chemistry class in the Aluminum Co. of America's new film, "Unfinished Rainbows," is told of the development of aluminum.

• • • Captain Alfred E. Hunt, center background, gives his ideas for popularizing aluminum to directors of the Pittsburgh Reduction Co.

• • • Napoleon III commissions Henri Sainte-Claire Deville, French scientist, to find an inexpensive process for aluminum production.

• • • Matthew Arnold, of the Griswold Mfg. Co., examines aluminum tea kettles made by the Pittsburgh Reduction Co.

• • • Professor Jewett in the 1880's explains to a class at Oberlin college the opportunities in commercial production of the metal.



• • • S. K. Colby, left, now an Aluminum Co. vice-president, sells a power company official his first line of aluminum transmission cable.

• • • Charles Martin Hall, former Oberlin student, shows a nugget of aluminum made by his revolutionary process.

• • • John O. Chesley, Aluminum Co. development division manager for the Aluminum Co., hears arguments for a mill to build structural shapes for streamlined railroad cars.

• • • Aluminum Co.'s film, "Unfinished Rainbows," telling the story of the development of aluminum, is available in 16 and 35 mm. widths. It is 35 min. long and was produced by Wilding Picture Producers, Inc., at the Hal Roach Studios.

PERSONALS . . .

• **W. K. Bailey** was last week elected vice-president in charge of sales of Warner & Swasey Co., Cleveland, and a member of the company's board of directors, filling the vacancy on the board caused by the death of Clifford S. Stilwell last November. **D. M. Pattison,** formerly assistant sales manager, was appointed sales manager to succeed Mr. Bailey.

Mr. Bailey's entire business career has been spent in the Warner & Swasey organization. He entered the company in 1919. Mr. Pattison joined Warner & Swasey in 1928 as a special apprentice.

• **D. E. Ralston** has been named executive assistant to S. E. Skinner, vice-president of General Motors, and Oldsmobile's general manager. Mr. Ralston formerly was in charge of Oldsmobile's automotive operations. **R. J. Wilkins** has been named manufacturing manager in charge of guns, shells, cannon and all other production at the Oldsmobile plant. **R. E. Griffin,** Oldsmobile's production manager in all departments, now has supervision over the division's contracts, subcontracting, buying, expansion of all ordnance production, schedules and methods. **John Dykstra,** factory manager during automotive production period, now becomes factory manager in charge of the division's gun plant. Mr. Wilkins has been associated with various divisions of General Motors since 1916, recently having been with the Southern California division of the company as general manager and on the labor relations staff at Detroit.

• **Forrest U. Webster,** past president of National Industrial Advertisers' Association and account executive of McManus, John & Adams, Detroit, has been ordered to active duty as captain, Field Artillery Reserve. He has been assigned to the Ft. Wayne Motor Supply Depot at Fort Wayne, Michigan.

• **Harry E. Smith,** general manager of the Manhattan Rubber Mfg. division of Raybestos-Manhattan, Inc., was elected a member of the board of directors of the Rubber Manufacturers Association, Inc., on Jan. 20.

W. K. BAILEY, recently named vice-president in charge of sales, and member of the board of directors of Warner & Swasey Co., Cleveland.

• **C. A. Puckett,** who for several years, has been associated with American Chain division of American Chain & Cable Co., Inc., at York, Pa., was recently appointed sales manager of the Weldless Chain department.

JAMES F. TOWERS, whose election as president of Ford, Bacon & Davis, Inc., New York, was announced in these columns last week.

• **Donald C. Bakewell,** vice-president, Blaw-Knox Co., Pittsburgh, has been awarded the Lorenz Medal for 1941 by the Steel Founders' Society.

The medal was established by the society as a memorial to the late Frederick A. Lorenz, and is awarded for outstanding service to the steel castings industry. Mr. Bakewell has served the society as president during the past two years.

• **Roger L. Putnam** has resigned as president of the Package Machinery Co., Springfield, Mass., to devote his full time as mayor of the city. He has, however, been made chairman of the board. Mr. Putnam's position as president is now filled by **George A. Mohlman,** vice-president and general manager of the concern since 1919.

• **Walter Williams** formerly in the Chicago territory, Manning, Maxwell & Moore, Inc., Bridgeport, has been assigned to the company's St. Louis territory.

• **Joseph Geschelin,** Detroit technical editor of Chilton publications, has been appointed by the Bureau of Ships, United States Navy, to assist in expediting procurement and manufacturing for the bureau within the automotive industry.

• **Leo C. Turner,** has resigned as treasurer of the Alabama State Chamber of Commerce to become associated with the Russell Foundry Co., Alexander City, Ala., in an executive capacity. A part of Turner's duties will be supervising cost accounting. He had been treasurer of the state chamber since October, 1940.

• **J. D. Wood** has resigned as president of the Roller-Smith Co., Bethlehem, Pa., to devote his entire time to his duties as chief engineer. **Reg Halladay,** lifelong friend and financial adviser to the late Col. Roller, and a director of the company since 1939, has been elected president. **F. A. Judson,** who joined Roller-Smith in September, 1941, as general manager, has been named treasurer.

• **Frank T. Bumbaugh** is the new assistant manager of sales, alloy division, of Carnegie-Illinois Steel Corp. Mr. Bumbaugh has served on committees of the American Iron and Steel Institute, and was recently made a member of the

Sucker Rod and Concrete Reinforcing Bar Committees of the War Production Board. He entered Carnegie-Illinois in 1926.

• **John J. Davis, Jr.,** will have charge of Carnegie-Illinois Steel Corp.'s Railroad Metals and Commercial Forging Division at Chicago during the absence of **Orrin H. Baker,** manager of this division, who is serving with the War Production Board in Washington. Mr. Davis is assistant manager of sales of the division.

• **Earl E. Berry,** vice-president of the Beloit Iron Works, Beloit, Wis., has been granted a leave of absence to act as a special consultant for the WPB in Washington.

• **Bernard (Barney) Desebrock,** service manager for Pawling & Harnischfeger Co., Milwaukee, was honored at a special celebration by his fellow employees on the occasion of his fiftieth anniversary with Harnischfeger. He started as an apprentice, later became a tool designer and machinery layout man and then assistant to the sales and general manager. Today, at 64, he still is active in the firm's defense work.

• **Walter Moehlenpah** has been appointed manager of the newly created Frostrode Division of Weltronic Corp., Detroit. For five years Mr. Moehlenpah was with the Milwaukee Railroad as conditioning and refrigeration engineer. Prior to that time he was associated with Bell Telephone System for eight years.

• **R. H. Cramer** has been appointed factory manager of the Hyatt Bearings Division, General Motors Corp., Harrison, N. J. Formerly assistant factory manager, he succeeds **C. P. Millard** who has resigned. Mr. Cramer joined Hyatt in 1922 as tool designer.

• **L. J. Haga** has been appointed chief metallurgist of the Kaydon Engineering Corp., Muskegon, Mich., manufacturers of special bearings and equipment. After graduating from the Michigan College of Mines and Technology in 1925, Mr. Haga became instructor in metallurgy at Purdue. Later he was instructor of metallurgy at Lewis Institute and most recently was associate professor of metallurgy at the Illinois Institute of Technology. He has written many papers on metallurgy, and has served as consultant to many companies.

• **Thomas O. Hardin,** former chairman of the Civil Aeronautics Authority Safety Board, has been appointed airlines consultant for the Pratt & Whitney Division of United Aircraft Corp. Mr. Hardin, a native of Texas, served with the Safety Board until its abolition in 1940, then was president of Southwest Feeder Airlines, and recently has been a consultant with the Defense Supplies Corp. at Washington.

• **A. H. Bond** has been named by Oakite Products, Inc., as Co-ordinator of its War Industries Work. Through Mr. Bond, information on the latest developments in production cleaning and related manufacturing operations essential to the manufacture of artillery, tanks, airplanes, rifles, shells, cartridge cases, helmets and other direct war goods, will be made available to the government and industry.

• **Peter Voss,** director of purchases of the Timken Roller Bearing Co., Canton, Ohio, recently retired after a 24-year period of service with the Timken company. He began as a clerk in the purchasing department, became purchasing agent in 1923, and since 1934 had served as director of purchases.

• **C. E. Walsh,** general purchasing agent of the Pennsylvania Railroad, has been appointed assistant to the vice-president in charge of real estate, purchases, and insurance. **E. J. Lamneck,** present purchasing agent, becomes general purchasing agent, and **J. S. Fair, Jr.,** assistant stores manager, takes Lamneck's place as acting purchasing agent.

• **H. F. Randolph** has been appointed plant manager of the new RCA tube manufacturing plant now under construction in Lacaster, Pa., and **Harold T. Albright,** formerly with the Camden works of RCA, has been named personnel manager.

• **H. F. Merchant** has been appointed sales and service representative in the Philadelphia area, for Progressive Welder Co., Detroit. He has been associated with Progressive Welder Co. since its inception and was formerly with the Chrysler Corp.

OBITUARY...

• **August Ziesing,** former president of American Bridge Co., United States Steel Corp. subsidiary, died Feb. 16, at Glencoe, Ill. Mr. Ziesing was born 84 years ago in Peru, Ill. He began his business career as a draftsman for the Pennsylvania Railroad. From 1883 to 1895 he was connected with the Lassig Bridge and Iron works in Chicago and later conducted a private practice as a consulting engineer. When the American Bridge Co. was formed he was appointed western manager and in 1905 was elected president, a post which he held for more than 21 years.

• **Carl Wagner,** aged 63 years, head of the Wagner Pattern Works, Milwaukee, died Feb. 12 at Manitowoc, Wis.

• **William O. Jeffery,** president of International Refining & Mfg. Co., Evanston, Ill., died Feb. 2 while enroute to Chicago from Tucson, Ariz. He was 68 years old. He founded the International Refining & Manufacturing Co. in 1914 and his son became associated with him in 1919 as co-partner. Mr. Jeffery continued in active management of the business until last December when management was assumed by W. O. Jeffery, Jr.

• **Lynde Bradley,** president of the Allen-Bradley Co., Milwaukee, died Feb. 8. He was a native of Milwaukee. He developed the idea of a carbon electrical regulator while working for the old Milwaukee Electrical Co. He founded the Allen-Bradley firm with his brother, Harry, and they later bought out the Pfeiffer & Smith Co., Milwaukee.

• **W. Woodard Williams,** California representative of Babcock & Wilcox Co. and Pittsburgh Crucible Division—Crucible Steel Co. of America, died recently in Los Angeles. Mr. Williams was formerly general manager of Babcock & Wilcox and also had been associated with Reading Iron Co., Bourne Fuller Co., and Pittsburgh Gauge & Supply Co.

• **Forest P. Sprague,** direct sales representative of Lucas Machine Tool Co., Cleveland, died Feb. 7. Mr. Sprague became the Lucas Company's first apprentice more than 40 years ago.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Women May Replace Men In Machine Tool Plants

Cleveland

• • • **With indications that the draft may rob the machine tool industry of some of the skilled employees it has fought to retain for many months now, the industry is now considering the possibility of training women to replace men lost to our armed forces.** Although the draft thus far has had very small effect upon the industry's personnel, a fair percentage of men have been lost through enlistment. THE IRON AGE reported some time ago that in British machine tool plants as much as 80 per cent of the personnel employed consisted of women, and it is not unlikely that many women can be added to American employment rolls provided that trade unions do not impose insurmountable obstacles to prevent this.

In view of the fact that the Defense Plant Corp. has agreed to make 30 per cent cash advances to machine tool producers against existing pool orders, it will not be necessary for customers to pay the 30 per cent cash advance which they had previously been asked for by machine tool representatives. This is a rather logical clarification of the complicated regulations surrounding the 30 per cent cash advance ruling.

The lack of synchronized deliveries of various machine tools to go into new defense plants has kept some promptly delivered equipment idle for as long as four months before such plants could be placed in operation. This unfortunate situation has not been aided by defense plants being awarded A-1-a priority ratings, since A-1-a ratings entitle the holders to a variety of delivery dates at different machine tool plants. At present, this circumstance is tying up the operation of a defense plant in this area, although it is likely that the company operating it may be able to secure used equipment to temporarily permit operations until the desired material is received.

The Austin Co. continues to buy considerable machine tool equipment to be delivered at certain Defense Plant Corp. units which Austin Co. is setting up for the government. Goodyear Tire & Rubber Co. is also in the market for a Midwestern plant. Among new buyers, the name of Tinnerman Products, Inc., has been added.

•

Working Toward 7-Day Week

Cincinnati

• • • **Lack of adequate personnel** is still holding in check the full installation of the so-called Cincinnati plan of seven-day operation of all factories. The program calls for work groups of triple units, with two men working 12 hr. on the off-day of the third, so that while plants work seven days, the men are limited to six-day weeks. On other days, the men would work 8 hr. on each shift. While most plants are working out the plan, second and third shifts are not fully manned, but even under ideal conditions the latter shifts can never fully equal the day shift for lack of general supervision. Of course, more emphasis on learner training is being made to eliminate the disparity, but this takes time and during training the old employee assigned to teach the newcomer is naturally not able to produce at capacity.

New business is almost a worry because of its continuance and briskness. Export demand, under lend-lease, appears to be undiminished and with the continued national requirement only serves to build backlogs higher.

Orders Placed for Steel Shell Cases

Washington

• • • Contracts for the manufacture of steel cartridge cases have been placed with several manufacturers, the War Department has announced. While the quantity of shell involved in the contracts was not given, it is not believed that the War Department is ready yet to go into large scale production on steel cases. The contracts are believed to be in the nature of development orders, designed to give industry an opportunity to experiment with materials and manufacturing procedures.

The development of steel cartridge cases, underway for some time, is expected to ease the tight copper and brass supply situation, freeing these materials for other war uses where substitution is not practical.

Extensive firing tests have shown that steel cases can be used successfully.

Developmental contracts have been awarded for the manufacture of steel cartridge cases for several sizes of artillery shells ranging from 20 mm. to 105 mm. Based on actual performance of the cases produced, additional lines will be established by concerns holding educational contracts.

Suppliers of cartridge cases are being canvassed to determine the feasibility of converting their facilities to the manufacture of steel cartridge cases. It is not anticipated that the conversion of manufacturing lines from brass to steel cases will result in serious delay. Ordnance Department experts in the drawing of steel will act as consultants to manufacturers in making the conversion.

Used Machine Tool Parts Made Available to Dealers

Albany, N. Y.

• • • **Simmons Machine Tool Corp.** is making available to other used machinery dealers and rebuilders and also to war contractors its stock of more than 100,000 parts of old machine tools, many of them "orphans" since the original manufacturers in some instances went out of business years ago. In the stock at Albany are more than 35,000 gears of various sizes and descriptions. The parts will be sold on a per pound basis or as a percentage of the new part price.

Expansion May Follow J. & L.-Otis Negotiations

Pittsburgh

• • • **When and if** the merger negotiations between Jones and Laughlin Steel Corp. and Otis Steel Co. are completed it is expected that a previous expansion program for Otis Steel involving one blast furnace and three open hearth furnaces will come up again for active consideration.

MARVEL SAWS are helping to speed production of Curtiss Airplanes in many ways in the Curtiss-Wright plants. This universal MARVEL No. 8 Metal-Cutting Band Saw was photographed at the St. Louis plant cutting out gussets for giant wing jigs—four ⅝" plates at a time. These jigs are used to assemble wings for Curtiss C-46 war planes which are similar to the new Curtiss C-55 U. S. Army Cargo-Transport ship shown here. The C-55 is the largest 2-motor airplane built.
Wherever you find the finest machine tools and most modern methods you will find MARVEL SAWS.
ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales Office:
225 Lafayette St., New York
MARVEL SAWS

Cast Iron Pipe

• **Town Council,** Danville, Iowa, asks bids until March 6 for pipe lines for water system, pumping station and equipment, storage reservoir and other facilities (Section 2). Fund of $120,300 has been arranged through federal aid for this and sewage system. Stanley Engineering Co., Muscatine, Iowa, is consulting engineer.

Water Department, Shreveport, La., will have plans and surveys made by Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer, for pipe line extensions in water system and other waterworks installation. Cost about $150,000. Federal financing has been arranged in that amount.

City Council, Dublin, Va., asks bids until March 2 for 20,900 ft. of 4-in. pipe for extensions in water system; also for gate valves, 46 hydrants, fittings, etc. Fund of $46,000 has been arranged through federal aid.

Waitsburg, Wash., plans pipe line extensions in water system and other waterworks installation, including pumping machinery and accessories. Bond issue of $30,000 has been authorized.

Water Department, Bremerton, Wash., plans pipe line extensions in water system and other waterworks installation for supply for Puget Sound Navy Yard properties and other service, including reservoir, pumping machinery and accessories, and other facilities. Cost about $617,000, with fund in that amount provided through federal aid.

Water Department, Hagerstown, Md., asks bids until March 12 for about 3300 ft. of 16-in. and 850 ft. of 12-in. pipe, for extensions in water system in Jonathon Street, Pennsylvania Avenue and other thoroughfares. Cost about $43,000. Charles Stumpp is city engineer.

Seattle, Wash., has awarded 215 tons to United States Pipe & Foundry Co. through Hugh Purcell, Seattle.

Supply Officer, Puget Sound Navy Yard, Bremerton, Wash., has taken bids on 138 tons of cast iron pipe and 10 tons of fittings.

Pipe Lines

• **Oklahoma Natural Gas Co.,** Tulsa, Okla., will begin work soon on new 12-in. welded steel pipe line from gas field area near Chickasha and Cement, Okla., to Stroud, Okla., about 100 miles, for natural gas transmission. Connection will be made with main eastern pipe line system of company at latter place for transmission to new army camp of government, now in course of construction at Cookson Hills, near Cookson, Okla., with lateral supply line to be built to that point, including control station, meter house and operating facilities at camp site. Bids have been asked for construction. Entire project will cost about $1,500,000.

General Purchasing Officer, Panama Canal, Washington, closes bids March 3 for 100,000 ft. of 1-in. galvanized, welded carbon steel pipe (Schedule 6015); until March 5 for valves, unions, brass and bronze pipe fittings, etc. (Schedule 6006).

Federal Works Agency, Eighteenth and F Streets, N.W., Washington, has awarded contract to Peter Mitchell, Inc., Hackett Building, Greenwich, Conn., at $37,255 for pressure pipe line system for gas distribution at government property at Stratford, Conn.

Tennessee Gas & Transmission Co., Chattanooga Bank Building, Chattanooga, Tenn., Curtis B. Dall, president, has applied for federal permission for proposed gas transmission system from Louisiana natural gas field area to eastern and northern points, previously noted in these columns, and plans to begin work in spring. Project will comprise a 24-in. welded steel pipe line from point near Eunice, La., to Muscle Shoals, Ala., passing through Louisiana and Mississippi, and from last noted place to point near Brace, Tenn. From that place two lines will be built, either 16 or 20-in., to vicinity of Nashville, Tenn., and about 12¾-in. to Alcoa and point near Knoxville, Tenn., respectively. Lateral lines will be built at points along route for gas supply for chemical and other plants in Tennessee, including aluminum works of Aluminum Co. of America, Inc., at Alcoa; also for similar industrial service for certain plants of TVA in Alabama and Tennessee, and for industrial service at Nashville, Knoxville and Chattanooga. Line will have initial capacity of about 155,000,000 cu. ft. daily, to be increased later to about 300,000,000 cu. ft., with installation of compressor stations at different points along route. It is proposed, also, to furnish natural gas at wholesale to gas distribution companies in Ohio. A pipe line gathering system will be installed in Louisiana fields, with convergence in vicinity of Eunice, La., point of main transmission system. Entire system will approximate about 800 miles of main lines and will cost close to $20,000,000.

Weekly Bookings of Construction Steel in Tons

Week Ended →	Feb. 24, 1942	Feb. 17, 1942	Jan. 27, 1942	Feb. 25, 1941	Year to Date 1942	Year to Date 1941
Fabricated structural steel awards	25,810	22,900	28,850	33,525	218,360	286,925
Fabricated plate awards	0	350	890	2,900	5,850	25,945
Sheet steel piling awards	0	0	100	1,200	790	5,450
Reinforcing bar awards	15,000	36,000	41,400	8,650	271,975	79,290
Total letting of Construction Steel	40,810	59,250	71,240	46,275	496,975	397,610

New Structures Completed At Landis Machine Co.

• • • **Landis Machine Co.** has completed an addition to its plant in Waynesboro, Pa., to facilitate present operations and materially increase its manufacturing capacity. The new addition includes a large structure which will house a new erecting floor and shipping department. A wing, 50 x 80 ft. extending from the main structure at the shipping department will house a box and crate manufacturing department as well as a lumber storage. A second building, one story in height, provides a convenient means for the storage of chips and cuttings. The chip storage building is divided into three compartments or rooms where chips and cuttings are stored according to their physical analysis.

War Expenditures Believed To be Around $145 Billion

• • • **Authorized** expenditures for war, including foreign orders, from the beginning of the defense effort through Feb. 15, 1942, plus net funds requested for war purposes now before Congress, total an estimated $145,400,000,000, according to the Division of Statistics, War Production Board.

This amount includes $104,698,000,000 made available by Congress, Reconstruction Finance Corp. commitments of $5,130,000,000, foreign orders in the United States of $4,066,000,000, and pending legislation before Congress of an estimated net $31,500,000,000.

Alloy Steel Alternates Published by AISI

New York

• • • **No. 5 in the series of pamphlets** on "Contribution to the Metallurgy of Steel" has been published by the American Iron and Steel Institute under the title of "Possible Alternates for Nickel, Chromium and Chromium-Nickel Constructional Alloy Steels." At the request of the OPM last fall, an informal committee of metallurgists selected from the institute, the Society of Automotive Engineers and other interested manufacturers held several conferences and performed certain experimental work for the purpose of studying possible alternates for these alloy steels.

The results of the study have been incorporated in a 144-page booklet, which is now available from the American Iron and Steel Institute, 350 Fifth Avenue, New York, at 50c. per copy. The publication contains much data in chart form, including graphical data on standard end-quench hardenability tests for all the alternate grades compared with the corresponding standard alloy grades.

Oliver Iron & Steel Builds 3 Heat-Treating Furnaces

• • • **Three new furnaces just** completed at Oliver Iron and Steel Corp., Pittsburgh, will enlarge its capacity for heat treated high carbon steel and common black bolts by approximately 240,000 pieces a day. One, a controlled atmosphere hardening furnace treats approximately 60,000 high carbon bolts a day; and two recirculating convection type furnaces have boosted the output of common black bolts by more than 180,000 bolts a day.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Idle Aluminum to Be Sold to Government

• • • **The threat of** stock requisitioning by the government developed this week when WPB, through J. S. Knowlson, Director of Industry Operations, notified some 500 manufacturing users of aluminum that all excess stocks must be sold to the government "or else." This action is expected to round up about 10,000 tons of aluminum, enough to build 2857 fighter planes of 666 four-engined bombers.

Where the metal can be used in its present form it will be shipped immediately to defense plants, but a high percentage will have to be remelted. The government salvage prices run from current market quotations for ingot and scrap, including castings and forgings, to 50c. a lb. for finished items valued at 99c. a lb. or more on Oct. 1, 1941.

The price schedule was worked out by the inventory and requisitioning branch of WPB after full consideration had been given to providing a fair and just return to the owner who has aluminum that must be turned in, and to proper protection of government interests.

The Federated Metals division of American Smelting & Refining Co. will be MRC's agent and handle the transactions. Regardless of the prices paid by the government, it was indicated that the companies to which the aluminum is sold will pay no more than the maximum scrap prices for aluminum that must be remelted.

In instances where holders of the light metal refuse to accept voluntarily the terms set up by WPB, the WPB can requisition the metal, leaving the question of compensation to be determined in accordance with procedures established under the requisitioning statutes.

Similar action on other metals is almost certain to follow as quickly and details can be arranged and an idea of the results to be expected determined from the present campaign on aluminum. Copper will most likely be the next metal for which a "smoke-out" of idle stocks will be instituted.

A DPC financed aluminum plant in New York City was indicated when it was learned that four of the eight projects to be developed will be in large cities where a surplus of power is available. The other cities are likely to be Boston, Chicago and Philadelphia. A characteristic of the power requirements is that "off peak" loads in cities with surplus power facilities can be utilized.

Dow-Chemical Co.'s magnesium plant that will be built at Ludington, Mich., by the Austin Co., Cleveland, will probably be the world's largest production plant. Metal will be extracted from underground brine.

The Far Eastern situation has dark forebodings. It is likely further extension by Japan will cut off supplies of zinc and lead from Burma and Australia, as it has tin supplies from that area. Some 60,000 tons of zinc and 473,500 tons of lead are produced annually in Burma and Australian lead production is second only to that of the United States.

Latin American copper mines received extended priority rating for maintenance and repair supplies. The A-1-d rating may now be used to expedite material to an amount double that shipped during the base period, and the A-3 rating may be used to acquire material in three times the amount shipped during the base period. The time covered by the order has been extended from Oct. 30, 1942, to April 1, 1943.

Ships that left the Far East prior to Dec. 4 are now arriving with heavy shipments of tin, far in advance of shipping documents. In some instances the tin has arrived before the owners knew anything about the shipment. General order time is being extended in the hope that the owner will be established within a day or two.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, Sa. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, 16.50c. a lb., New York; American, 14c. a lb., f.o.b. smelter. QUICKSILVER, $191 and $193 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

Road Tells of Extended Deliveries of Locomotives

St. Louis

• • • **"American locomotive** builders will be unable to make deliveries of locomotives until at least mid-summer, and probably not before the fall of 1943," the St. Louis Southwestern Railway told the United States District Court here in its petition asking for authority to build five freight locomotives.

The petition stated the road proposed to build these locomotives in its shops at Pine Bluff, Ark., and probably be made available for service early in 1943 at a cost of $875,000. The road stated that it had ordered the boilers for these five locomotives from Baldwin Locomotive Works.

Other recent locomotive awards include: Baldwin Locomotive Works: 20 4-8-4-71 for Atchison, Topeka & Santa Fe and 10 4-6-6-4 for the Denver & Rio Grande Western.

American Locomotive Co.: 10 to 15 4-6-6-4 for Northern Pacific, and 30 4-6-6-4 for the Union Pacific.

Lima Locomotive Works: 25 4-6-4 for the New York Central.

New Haven has ordered five electric freight locomotives from the General Electric Co.

Wickes Bros. Adds to Plant

Saginaw, Mich.

• • • **Wickes Bros.**, machine tool plant, is making an addition to its present buildings and expects the new facilities to be completed in July, it has been announced.

SCRAP

Scrap Session Told Stringent Measures Will Beat Chiselers

Chicago

• • • **The nation's** leading iron and steel scrap dealers and brokers meeting here last Saturday and Sunday in their annual convention received little comfort from government leaders. They were told not to expect higher scrap price ceilings and were warned auto graveyard scrap will be requisitioned.

OPA representatives appearing before the convention of the Institute of Scrap Iron & Steel, Inc., said the days of voluntary compliance with scrap regulations are over. Ross K. Whitman, in charge of the planning and policy section of OPA, promised that for every new trick devised to beat the schedule, the OPA would concoct a more stringent law as a counter agent.

"The few chiselers will make it harder for the great majority who willingly abide by the schedule," he said. Whitman also told his audience that scrap prices now were about 35 per cent over 1939 averages and that no further price increases would be granted unless there was heavy evidence available showing an increase was absolutely necessary. "The OPA will be with you a long time," he said, "for this is going to be a long war."

Frank Vigor, head of raw materials of the iron and steel branch of the War Production Board, said 47,000,000 tons of scrap were consumed in 1941 and that it was estimated 1942 would require 60,000,000 tons. Of this sum, about 27,000,000 would be purchased scrap, and officials estimated that a shortage of about 6,500,000 tons would exist this year, less whatever increase in pig iron production was achieved with new blast furnaces scheduled to come into production during the year. Vigor definitely promised firmer control by allocation of scrap supplies. "We will never be able to completely allocate scrap as we do pig iron," Vigor stated. "There are about 3000 consumers for both items, but there are only about 62 pig iron producers and there are close to 20,000 sources of scrap; but we are going to spread the method of scrap allocation and tighten our control."

Paul C. Cabot, Bureau of Industrial Conservation, explained the system of getting auto graveyard scrap. Forms have been provided which must accompany every offer and deal for scrap in this category. Any fair offer which is rejected will be investigated by the bureau's field corps and if necessary the scrap will be immediately requisitioned. Cabot promised the scrap leaders that the bureau was desirous of maintaining the flow of scrap through the regular commercial channels which have always existed; but he demanded harder work on the part of scrap interests in order to maintain their customary marketing channels.

Institute members heard Louis Levin, scrap supervisor, Department of Munitions and Supply of Canada, explain Canada's rigid control of scrap. Levin informed his listeners that violation of government regulations in time of war was "treachery" and urged the industry to give wholehearted cooperation to schedules.

Formation of a non-profit organization to get light scrap from remote areas was announced. The plan is to prepare bundles in the remote areas for shipment to consuming centers. Contributions were solicited at the meeting and a few important ones obtained.

Edwin C. Barringer, executive secretary of the institute, was elected president of the body, at the same time retaining his former post, as well.

Other national officers, all re-elected, are vice-president, Philip W. Frieder, Philip W. Frieder Co., Cleveland; secretary, George L. Sturm, Middletown Iron & Steel Co., Middletown, Ohio; treasurer, Everett B. Michaels, Hyman-Michaels Co., Chicago. Directors elected for two-year terms were Max Schlossberg, M. S. Kaplan Co., Chicago; Joseph E. Jacobson, Luria Brothers, Pittsburgh; Herman Moskowitz, Schiavone-Bonomo Corp., Jersey City; Darwin Luntz, Luntz Iron & Steel Co., Canton, Ohio; C. C. Cohen, I. J. Cohen Co., Kansas City. Directors elected for a one-year term: Harry Alvin, Grant Iron & Metal Co., Detroit; Frank Gordon, Harcon Corp., Boston; Harry J. Kiener, Hickman-Williams Co., St. Louis; Wm. Wolf, Wolf & Co., Hamilton, Ohio; A. Cohen, Lynchburg Iron & Metal, Lynchburg, Va.

Public Drive Costly; Yields Little Scrap

New York

• • • For three successive Sundays the city dispatched its sanitation trucks and men at a cost of $7,500 to collect waste materials, but only 1779 cu. yd. accrued. According to William Carey, sanitation commissioner, "Salvageable material is not available in large quantities." Other officials pointed out hundreds of collectors are active in addition to Carey's department and the true total of the voluntary drive, while unknown, is considerably larger than Carey's report indicates.

Tin Can Scrap Is Dislocated by New Price Differential

• • • **In view of the** uncertainties, fears and confusion existing in the iron and steel scrap trade resulting from the ever-shifting price setup, it is considered remarkable by many authorities that steel mill and foundry operations have maintained such high levels recently.

Amendments to the price schedule not only have been frequent and not entirely understandable to sellers and buyers, but have come out without adequate advance notification. Appeals for amplification and information have not always been satisfied, say trade executives, pointing out that in several instances phases of the war program have been hindered because of the uncertainty created.

At the same time, public drives, fine in theory, have failed in the aggregate to come up to expectations in producing good iron and steel scrap. Meanwhile, offices of some steel mill scrap buyers have assumed the air of scrap brokerage houses.

Months ago, if the Navy desired a few thousand tons of plate punchings for ballast for dry docks, dealers would have known how to proceed toward promptly splitting up and filling the order, but as matters stood late last week it was difficult for the Navy to find takers for the task because of the uncertainty

over whether dealers could go to certain places.

Tin can scrap, being used liberally by steel mills over the nation until two weeks ago, has been dislocated by Amendment No. 14 to the scrap price schedule. One mill is reported to have rejected 15 cars of bundles within 24 hours last week because they contained tin can scrap and had been billed as straight bundles. This resulted in loss of the scrap by the mill. Dealers who had been picking up 25 to 30 tons per week from incinerators stopped the practice. Dealers contend differentials of $5 and $8 per ton are entirely out of line and should be reduced.

Railroads won't be able to lift old rails on a large scale, and won't be offering relaying rails as generously as they planned. Eastern carriers meeting in New York last week decided to make a strong protest to WPB and other official bodies against a 50 per cent cut in the allocation of steel rails for first quarter of this year.

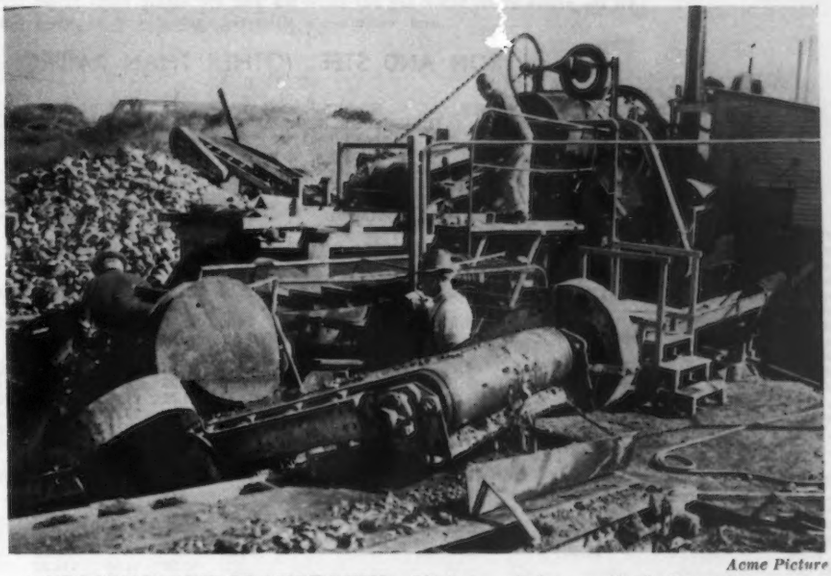
One railroad official stated that Eastern roads had been allocated 538,000 tons of new rail, but this had now been cut to 219,000 tons.

The record rate of consumption of iron and steel scrap of late 1941 carried over into January, 1942. It is estimated by the Institute of Scrap Iron & Steel Inc., Washington, that 4,590,000 gross tons of home and purchased scrap were melted by steel mills and foundries to make new steel and castings. This slight decline from the 4,634,000 gross tons consumed in December is attributed to the more severe weather which handicapped the operations of the steel industry. The January total is only fractionally lower than the all-time record of 4,662,000 tons consumed in March, 1941.

In 1941 the monthly average consumption of scrap was 4,469,000 tons, while in 1940 it was 3,474,000 tons. Thus, 1942 has opened on a basis which, if carried through, would set another high record.

•

NEW YORK—Scrap is being kept on the move here and is going to the mills and foundries where it will do the most good. Rejections for tin can content in bundles have aroused considerable discussion, resulting in loss of the scrap to some mills which held out for a differential of $8 per ton.



Acme Picture

A PROSPECTOR'S PLAYGROUND: Modern mining methods have been put to use on an old Los Angeles dump. Out of 100 tons of trash sifted daily, about half a ton of usable metal is recovered, about $3,000 worth per month. The machinery includes revolving magnet (at right) and conveyor belt which carries away discards.

CHICAGO—The district is now undergoing its "official" survey of auto graveyards, but this scrap started out several weeks ago in heavier flow than ever before. The scrap institute's disciplinary action against two members was based on shipments of bundles which are alleged to have included plaster, cement, stone, slag and other foreign substances. However, it is understood this material was caught before it damaged any furnaces. Tin cans are being sold to mills without any difficulty. Though not previously admitted, it is understood now that this practice has been going on for some time.

•

PITTSBURGH—At least a portion of the freer movement of scrap in the Pittsburgh district can be ascribed to the releasing of auto graveyard scrap in the past several weeks. The response to the concerted drive on the emptying of these yards has been fairly satisfactory so far with few, if any, auto wreckers refusing to go along with the program. Government sources have reiterated that automobile graveyard scrap must be sold at a price which allows the preparation and delivery to the steel mill within the OPA price ceiling.

•

BUFFALO — Practically every large scrap firm here has contracted for 1000 or more tons of auto scrap from proprietors of graveyards. One leading scrap broker predicted the result will be a return to the normal rate of receipts within a month. This will mean a 50 per cent improvement over the present flow of scrap.

•

CINCINNATI — The auto graveyard program is beginning to move worth while quantities of old materials into industrial channels. Recent allocation has helped district users generally, although the cast grades are still tight.

BOSTON—With temperatures hovering close to zero, less material is being moved. Confusion as to the status of Providence, R. I., and other southern New England cities as regards basing prices is another trade halting factor.

•

DETROIT—A serious drive for graveyard scrap by the WPB conservation department is being launched this week. The recent action on the price of bundled cans has brought this business virtually to a standstill although some yards are still collecting tin cans in the belief that they will again be a saleable commodity. Ford has only six of ten furnaces operating this week because of scrap shortages. An allocation covering 15,000 tons has not had a chance to produce much result. Great Lakes is operating 15 furnaces, although it expected to have only 14 on late in the week. Incidentally, this company reports it has lost some bottoms as the result of using tin plated materials.

Connecticut Moves Toward Salvaging Trolley Tracks

Hartford, Conn.

• • • **All steel rails** formerly used as trolley car tracks may be removed from state highways, under permission given the State Salvage Committee by the State Highway Department, Feb. 19. About 60,000 tons of steel are involved. WPA will pay the cost of recovering the steel, except within municipalities, where costs will be shared.

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	22.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

Bundles with less than 50% tin coated material are $5 per gross ton below basic open hearth grades; those with more than 50% tin coated material are $8 below basic open hearth grades.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports $1; New England $1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use in explosive making) add $5 to price of cast iron borings; for chemical use outside explosives making, add $3.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21 00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: states not named in A and B; switch district of Kansas City, Kan., Mo.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Feb. 24, 1942	Feb. 17, 1942	Jan. 27, 1942	Feb. 25, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip No. 302	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, bars	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Feb. 24, 1942	Feb. 17, 1942	Jan. 27, 1942	Feb. 25, 1941
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	24.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh	$20.00	$20.00	$20.00	$21.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.25
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.75
Low phos. plate Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh	22.00	22.00	22.00	22.25
No. 1 cast, Philadelphia	24.00	24.00	24.00	23.75
No. 1 cast, Chicago*	21.00	21.00	21.00	19.75

*Changed to gross ton basis April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$5.50
Foundry coke, prompt	6.875	6.875	6.875	5.75

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	53.00
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 126 to 132 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 24, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.45 a Gross Ton	$20.08 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

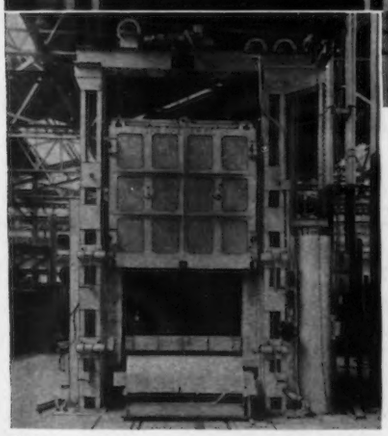
Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars **	Pacific Ports, Cars **	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢					2.80¢	(Worcester 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester 3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			3.37¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massilon, Canton 2.70¢)						2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
								(Coatesville and Claymont 2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(11)		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville 3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester 2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester 2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester 3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributors. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. ** Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.



Heat loss is kept down . . . temperatures are controlled accurately . . . in this electric car-type furnace built by the Drever Company, Philadelphia. Walls and arches have 9" of Armstrong's A-26 Insulating Fire Brick.

Part of a battery of seven car-type annealing furnaces also built by the Drever Company. All 7 have the dependable protection of 9" of Armstrong's A-26 Brick.

Armstrong's Insulating Fire Brick help keep this vital furnace battery firing efficiently.

NOT a lineup of 75's. Not a battery of mortars or howitzers. This equipment has an equally important offensive part to play. These four oil-fired carburizing furnaces, built by the Drever Company, are turning out material vital to our war effort. Nine-inch walls and arches of Armstrong's Insulating Fire Brick (A-26) are helping to keep these furnaces at peak efficiency.

The properties of Armstrong's Brick make them ideally suited to this and similar services in many types of furnaces. These brick rate high in insulating efficiency, physical strength, spalling resistance, and uniformity. They have low shrinkage and ample refractoriness for the use intended. They are light in weight and have low heat storage, aiding quick heating and faster cycles in intermittent operation.

There are five types of Armstrong's Insulating Fire Brick for varied temperatures and types of service, they are: Armstrong's A-16, A-20, A-23, A-25, and A-26.

Engineering Service

Experience gained from more than 27 years of leadership in the manufacture and use of lightweight refractories is at your service. Armstrong engineers will be glad to help you choose the right brick, the right cement, and the best method of application for your equipment. Write for full data to Armstrong Cork Company, Insulating Refractories Dept., 978 Concord St., Lancaster, Pa.

ARMSTRONG'S INSULATING REFRACTORIES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....
Everett, Mass.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....$31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	**22.00**	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. E. & G. Brooke Iron Co., Birdsboro, Pa., is permitted to charge $1 in excess of maximums specified in Price Schedule No. 10.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

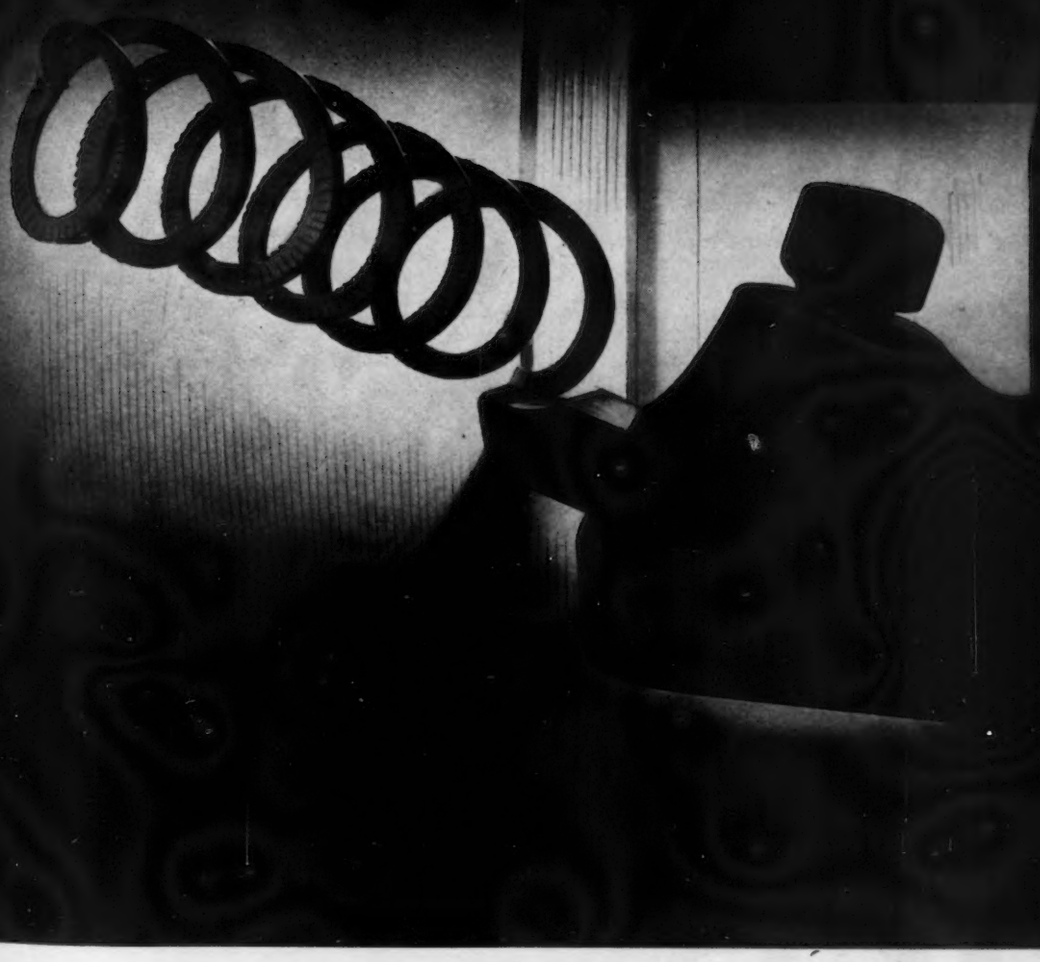
WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.65
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7,45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43.

. . . Ask your supplier about Molybdenum high speed steels. Experience proves they pay.



You know what you want from your cutting tools. Here's what users are getting from molybdenum high speed steels, in comparison with the tungsten types.

Equivalent cutting properties Greater toughness Lower cost

These are facts — with nine years' experience in thousands of shops to back them up. Check cost and performance records with any user you like. See your supplier for the proper analysis and heat treatment for your requirements.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED · FERROMOLYBDENUM · CALCIUM MOLYBDATE

Clima[illegible] Molybdenum Company
500 Fi[illegible] Ave[illegible] · New York City

MOLY

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446*
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

* Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

* In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

* 15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

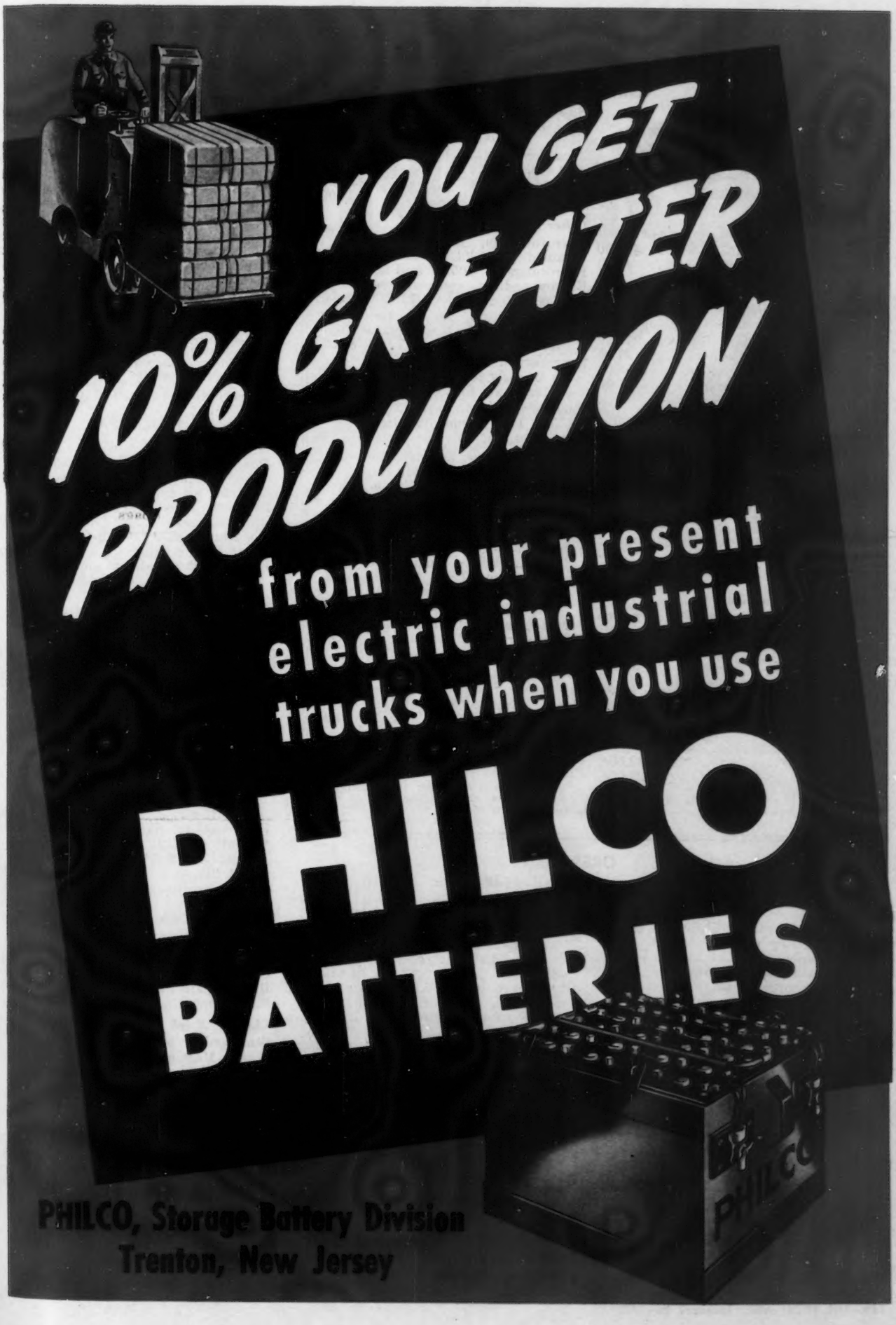
Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.


YOU GET
10% GREATER
PRODUCTION
from your present
electric industrial
trucks when you use
PHILCO
BATTERIES
PHILCO
PHILCO, Storage Battery Division
Trenton, New Jersey

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio.....$29.50*
Buffalo 30.75*

For each addition 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload....$ 2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.....$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50.... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn. .....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn. .....81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..$28.00
Rhodesian, 45 .....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt..$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel ..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Fire Clay Brick *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail $25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.. .....$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00